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A National Environmental/Energy Workforce Assessment. Region I

National Field Research Center, Inc, Iowa City, Iowa

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A National Environmental/Energy Workforce Assessment

REGION I

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16. ABSTRACT

This study is one of 70 volumes assessing the workforce needs (manpower needs) for pollution control and abatement in the United States for the five-year period of 1976 through 1981. Seven fields for pollution control — air, noise, pesticides, potable water, radiation, solid waste, and wastewater — are analyzed, together with energy-related programs currently accentuated by the national effort to solve energy supply problems.

Designed as Phase I of a three-phase program, the complete assessment includes the following volumes: one each for the 50 states, the District of Columbia, Puerto Rico, and the Virgin Islands; one for each of the ten EPA regions; a one-volume National Abstract; a volume on National Legislation; a volume on Business and Industry; and a four-volume National Summary. The information was gathered through extensive personal interviews with responsible federal, state, and local officials in every state; with officials of representative private industrial and commercial firms; and with representatives of national industrial and trade organizations.

Phase II will develop a broad national inventory of the entire range of post-secondary and higher education training offered in the pollution control and energy areas cited above, and Phase III will offer demonstrations for curriculum changes or modifications which appear necessary to assure an adequate and properly trained national environmental/energy workforce.

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NATIONAL FIELD RESEARCH CENTER, INC

Under Grant from:

UNITED STATES

ENVIRONMENTAL PROTECTION AGENCY

Grant #T900591010
1977

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Phase I of the National Environmental/Energy Workforce Assessment conducted by National Field Research Center, Inc., within Region I of the United States Environmental Protection Agency (EPA) can attribute much of its success to the coordinative efforts of both Mr. Edgar Bernard, Regional Manpower Officer, and Ms. Elaine Pickle, Water Programs Manpower Officer. Their invaluable assistance in guiding our staff to the appropriate program personnel and directors within their regional headquarters, as well as within the six New England states, has aided us tremendously in effecting our mission. A special thanks is also extended to Mr. Byron Keene, Chief of the Radiation, Noise, and Solid Waste Branch; Ms. Abigail B. Homer, Program Analyst of the Water Programs Division; and Mr. Steve Lathrop, Head of the Operations Section of the Water Supply Branch for their input and cooperation.

The following individuals also provided their advice, comments, and confidence regarding workforce assessment. These professionals voiced support for its innovative concept of matching environmental employment needs with specific educational training programs designed to fulfill those needs; subsequently placing qualified people into meaningful work. They include the following:

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Management Division

PREFACE

This regional report represents a detailed summation of existing workforce levels, training and certification programs, career potential, and staffing level projections through 1981 for EPA Region I Headquarters. It also examines the seven areas of pollution control and abatement activities (air, noise, pesticides, potable water, radiation, solid waste, and waste water) over which EPA has varying degrees of statuatory authority. Additionally, a section overviewing current federal regional activities in energy as it relates to pollution control and abatement is included. The study was undertaken by NFRC to provide the Office of Federal Activities (OFA) of Headquarters EPA with a strategy for supporting and implementing environmental educational and career training programs based on those needs and growth trends evidenced from the initial workforce assessment designated as Phase I of a three phase program.

The information presented in this regional report was compiled primarily through personal interviews with program administrators as well as various planning documents supplied by them. Where actual long term workforce planning had not been approached by a specific program, the individuals interviewed were requested to speculate, within the realm of their best professional judgement, on what they realistically perceived their workforce increases would be over the next five years.

FOREWORD

The following report represents five year projections for staffing levels of the seven major pollution control and abatement programs within EPA Region I. Individual narrative abstracts of training, workforce profiles and projections, and career potential are addressed within each program with a final remark included in each section to provide a brief overview. The specific pollution programs considered by this study come under the regulatory auspices of EPA and include air, noise, pesticides, potable water, radiation, solid waste, and waste water. The content of each program section in this report is limited to the control authorities which EPA possesses. Additionally, this report includes summaries of federal energy-related programs pertaining to Region I which have significant activities addressing the problems of polluting byproducts of energy generation and transmission.

It must be noted that all the regulatory programs of EPA Region I are not segregated into autonomous sections. In fact, various functions overlap; interdivisional responsibilities exist; and certain components of all pollution activities are integrated into central support programs to avoid duplication. Examples of these centralized service programs include the Enforcement Division, the Surveillance and Analysis Division, and the Management Division which perform similar tasks for each of the pollution control programs yet remain independent.

A large portion of the information contained in this Regional report represents the best professional judgements of those persons surveyed. In cases where more than one person provided judgements concerning expected real workforce growth in a specific program area, the resultant projections were determined by the National Field Research Center staff through a step-by-step, comparative analysis of all planning. documents as well as all data collected during interviews.

National Environmental Energy
Workforce Assessment

Phase I

REGION I

Report

REGIONAL PROFILE

Introduction

Region I of the U.S. Environmental Protection Agency serves the six contiguous states of the New England area: Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont. As one of the earlier pioneers of the Industrial Revolution, New England has historically been confronted with the problems associated with pollution and its associated degradation of the environment. Due to this early exposure to the effects of unrestricted commercially generated pollutants, New Englanders have traditionally maintained a conscious concern for environmental quality through the development and utilization of advanced technologies in pollution abatement and control planning and equipment as well as the enactment of progressive environmental legislation.

In 1972, the population of Region I was estimated to be 12,198,000, with approximately 76.4 percent of all individuals living and working in urban areas possessing generally higher concentrations of environmental contaminants. A look at the geographic distribution of growth within the Region between 1970 and 1974, based on information provided by the Department of Commerce, shows that those predominantly urban areas of New England (eastern Massachusetts, Rhode Island, and southern Connecticut) have actually experienced a negative growth rate in population while the nonmetropolitan areas in each of these three states, as well as Vermont, New Hampshire and Maine, have experienced a large population

U.S. ENVIRONMENTAL PROTECTION AGENCY - REGION I

GEOGRAPHIC RESPONSIBILITIES

Figure 1.

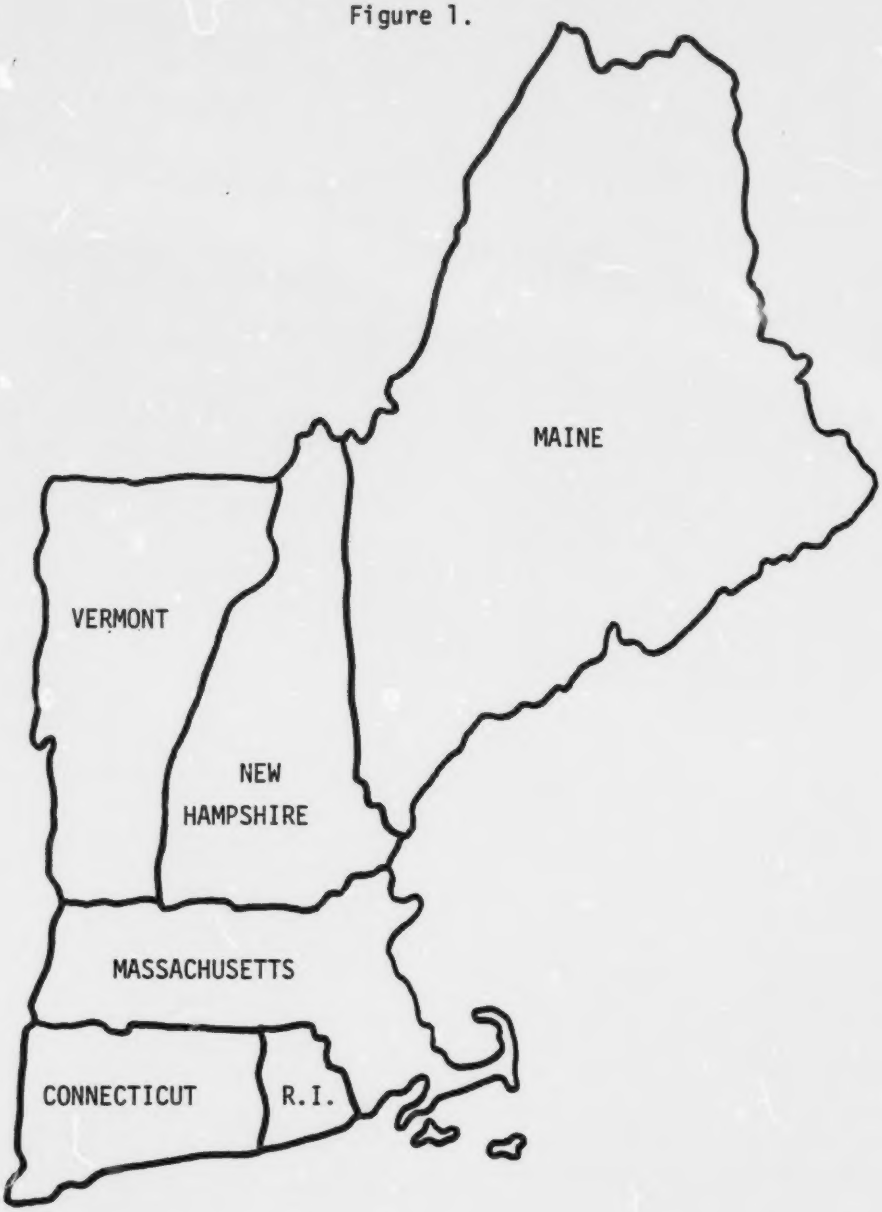

MAINE
VERMONT
NEW HAMPSHIRE
MASSACHUSETTS
CONNECTICUT
R.I.

Figure 2.

POPULATION STATISTICS FOR REGION I

State	U.S. est. 1975	1970 Census	1960 Census	Pct. + or -	1970		Pct. Urban
					Urban	Rural	
CONNECTICUT	3,095,000	3,032,217	2,535,234	19.6	2,345,052	686,657	77.4
MAINE	1,059,000	993,663	969,265	2.5	504,157	487,891	50.8
MASSACHUSETTS	5,828,000	5,689,170	5,148,578	10.5	4,810,449	878,721	84.6
NEW HAMPSHIRE	818,000	737,681	606,921	21.5	416,040	321,641	56.4
RHODE ISLAND	927,000	949,723	859,488	10.5	824,930	121,795	87.1
VERMONT	471,000	444,732	389,881	14.1	142,889	301,441	32.2
TOTAL	12,198,000	11,847,186	10,509,367	12.7	9,043,517	2,798,146	76.4

Source: Census Bureau

growth rate, generally thought to be related to the quality of life and surroundings offered by these areas. Comparatively speaking, the Northeast exhibits the largest rate of nonmetropolitan growth relative to urban growth of any part of the country. Finally, it should be noted that the population of New England represents about 6% of the nation's total.

Geography

New England encompasses 66,500 square miles bounded by Canada to the north, New York to the west and south, and the Atlantic Ocean to the east. Internally, New England possess 3,649 square miles of rivers, lakes, and streams.

GEOGRAPHIC STATISTICS FOR REGION I

	Extent in Miles		Area in Square Miles		
State	Long	Wide	Land	Inland Water	Total
CONNECTICUT	90	75	4,862	139	5,001
MAINE	235	205	30,920	2,295	33,215
MASSACHUSETTS	190	110	7,826	431	8,257
NEW HAMPSHIRE	185	90	9,027	277	9,304
RHODE ISLAND	50	35	1,049	165	1,214
VERMONT	155	90	9,267	342	9,069
TOTAL			62,951	3,649	66,600

Agriculture

Agriculture in New England is limited, somewhat, due to the large local variations in topography. However, on a proportional basis, Region 1 has a total number of farms consistent with its total area when compared with national statistics. Agricultural foodstuffs, accounting for the largest part of farm receipts, include the following items: poultry and dairy products, potatoes, vegetables, forest products, greenhouse and nursery products, cranberries, applies, and maple syrup. Additionally, seafoods harvested include lobsters, fish and mollusks. In this respect, New England leads the country in overall total production due to the nutrient rich upwellings off its coast in the Georges Banks area, as well as the prevalence of secluded estuaries along its Atlantic coastline suitable for shellfish production.

Economics

Economically New England is a leader in industry and commerce with continuous innovations in engineering and planning emanating from its research and development communities. Per capita personal income in Region I grew 42 percent between 1970 and 1975, 6 percentage points less than the national average income growth. This nominal growth, however, was considerably offset by inflation during this five year period, resulting in a relatively static growth in per capita income.

Commerce and Industry

The economic base of Region I depends greatly upon the heavy concentration of corporate industrial complexes situated primarily in the three southernmost states of Connecticut, Rhode Island, and Massachusetts. Concurrently, the larger population densities are located in these states, as the opportunity for specialized employment is greatest in this area. Together, these two aggregations of commerce and labor create much of New England's pollution problems. Generally, EPA has provided larger financial support to the pollution control agencies within these states.

Leading industrial groups in the Region are involved in the production of a variety of goods generally classified as high technology equipment. Products such as computer components, aviation equipment, communication equipment, electronic components, nuclear submarines, and pollution control equipment give credence to the Region's designation as the country's leader in engineering research and development. Ancillary commercial activities include a variety of multinational service type organizations, among which are insurance companies and financial institutions, which provide New England as well as the nation with sound financial and managerial support and confidence.

The pollution control industry in New England employs a substantial number of people and overall it is estimated that in the state of Massachusetts between 35,000 and 50,000 are employed in this sector. It should be also noted that the bulk of these jobs do not derive their existence totally from federal expenditures.

In conclusion, pollution control technology has created more jobs in Region I than any other current or emerging technology. In turn, a clean environment will indirectly create thousands more jobs in Region I as New England becomes a more attractive place for tourists as well as new industry, proving that environmental legislation does in fact have a stimulating effect on New England's economy, quantitatively and nonquantitatively, despite any short term losses in productivity.

Organizational and Operational Structure

ORGANIZATIONAL AND OPERATIONAL STRUCTURE OF U.S. EPA REGION I

The following description of EPA Region I's organizational and operational structure was provided by officials from the Boston Headquarters:

The United States Environmental Protection Agency (EPA) is charged with mounting a coordinated attack on environmental problems of air and water pollution, safe drinking water, solid waste management, radiation, noise and pesticides. EPA is an independent, regulatory agency with one mission--to protect and enhance the environment. The Administrator of EPA reports directly to the President of the United States.

EPA was created by a major reorganization plan July 9, 1970, and opened its doors for business December 2nd of that year. Under the reorganization, responsibility for fifteen different programs from various federal agencies was vested in EPA. This organizational structure reflects an effort to end the piecemeal approach to the nation's environmental problems that had in the past often inhibited progress, and to bring the major federal environmental programs together under one roof. Most important, EPA gives to the American people an independent, impartial agency to serve as their advocate for a liveable environment.

However, EPA is by no means the sole policy-maker and enforcer in environmental matters. It has set standards, sometimes in cooperation with the states, which have the force of law and which define the kinds and amounts of pollutants that may enter the air and water. It has, whenever possible, worked in cooperation with the states to develop implementation plans and compliance schedules.

EPA also administers funds to regional, state, and local agencies to support their pollution abatement activities. Monies may be granted for planning and support of pollution abatement and control programs; for design, engineering, and construction of pollution control facilities; and for manpower training in pollution control techniques.

Enforcement of standards is shared with the states. Although in some cases the federal government has primary enforcement authority, in most instances the federal government acts only when a state fails to do so.

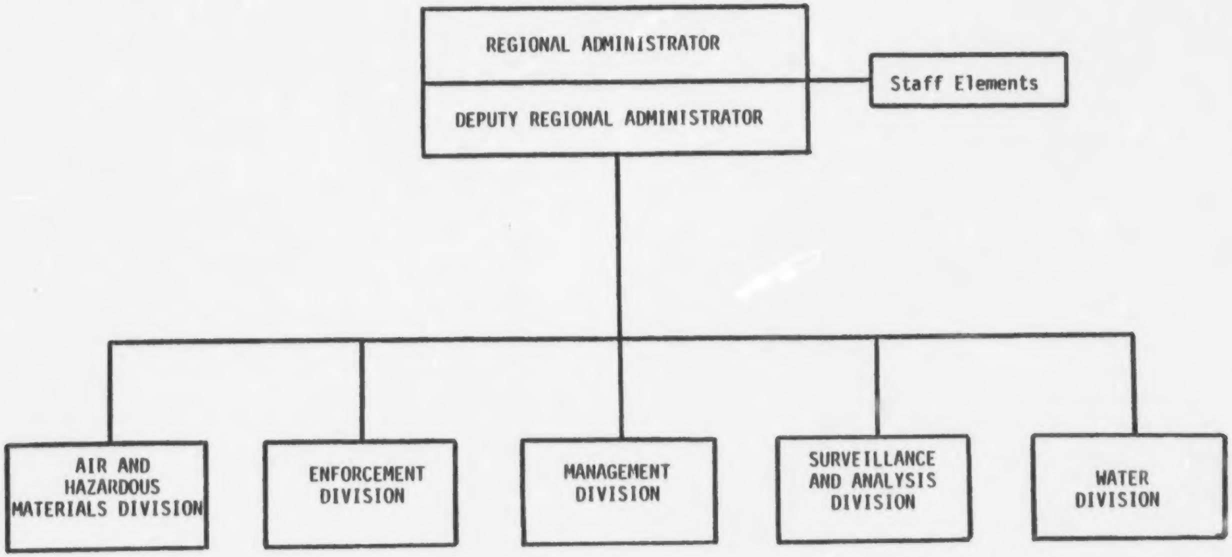
To insure that EPA is truly responsive to environmental needs in every part of the country, it has established a strong field organization, staffed by specialists in each program area and headed by a Regional Administrator possessing broad authority to act for EPA in matters within his/her jurisdiction.

Region I of EPA has its headquarters in the John F. Kennedy Federal Building in Boston's Government Center. It had an annual budget of approximately $380 million for Fiscal Year 1976. The Regional Office employs more than three hundred people. The Regional Office carries out EPA's programs in the six New England states--Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont.

ENVIRONMENTAL PROTECTION AGENCY

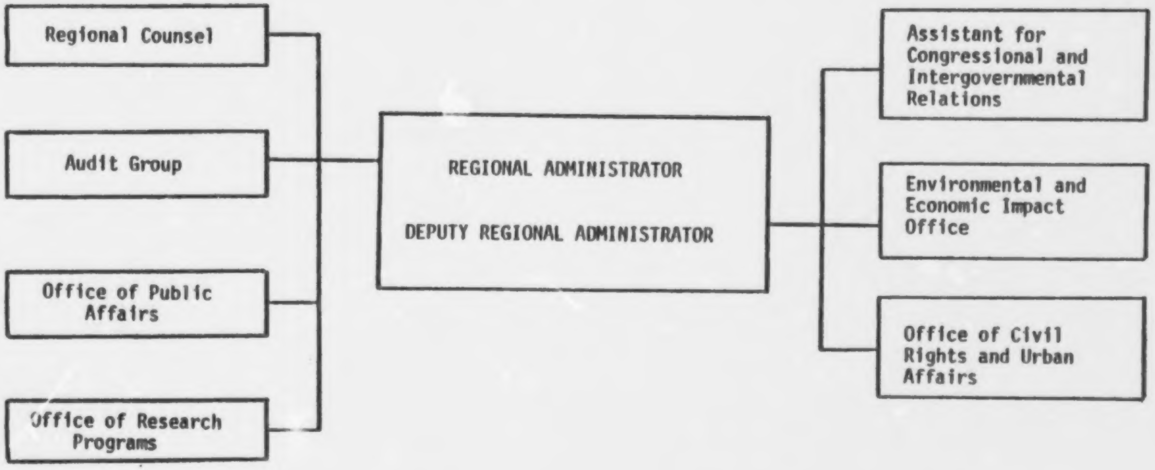
REGION I

Figure 3.


REGIONAL ADMINISTRATOR
DEPUTY REGIONAL ADMINISTRATOR
Staff Elements
AIR AND HAZARDOUS MATERIALS DIVISION
ENFORCEMENT DIVISION
MANAGEMENT DIVISION
SURVEILLANCE AND ANALYSIS DIVISION
WATER DIVISION

OFFICE OF THE REGIONAL ADMINISTRATOR

Figure 4.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Assistant for Congressional and Intergovernmental Relations
Environmental and Economic Impact Office
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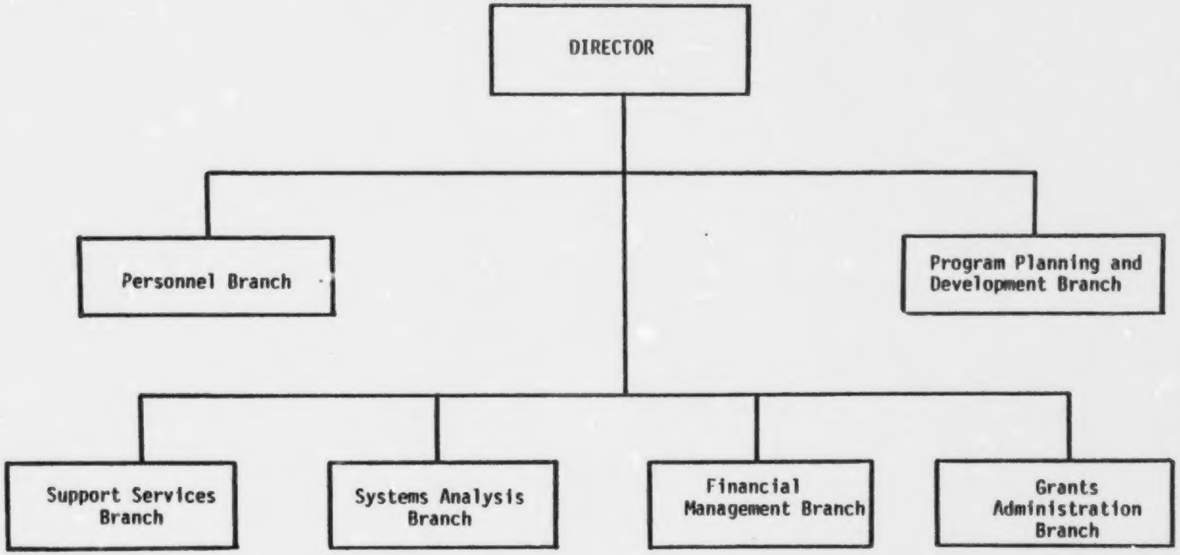
EPA REGION I

MANAGEMENT DIVISION

Figure 5.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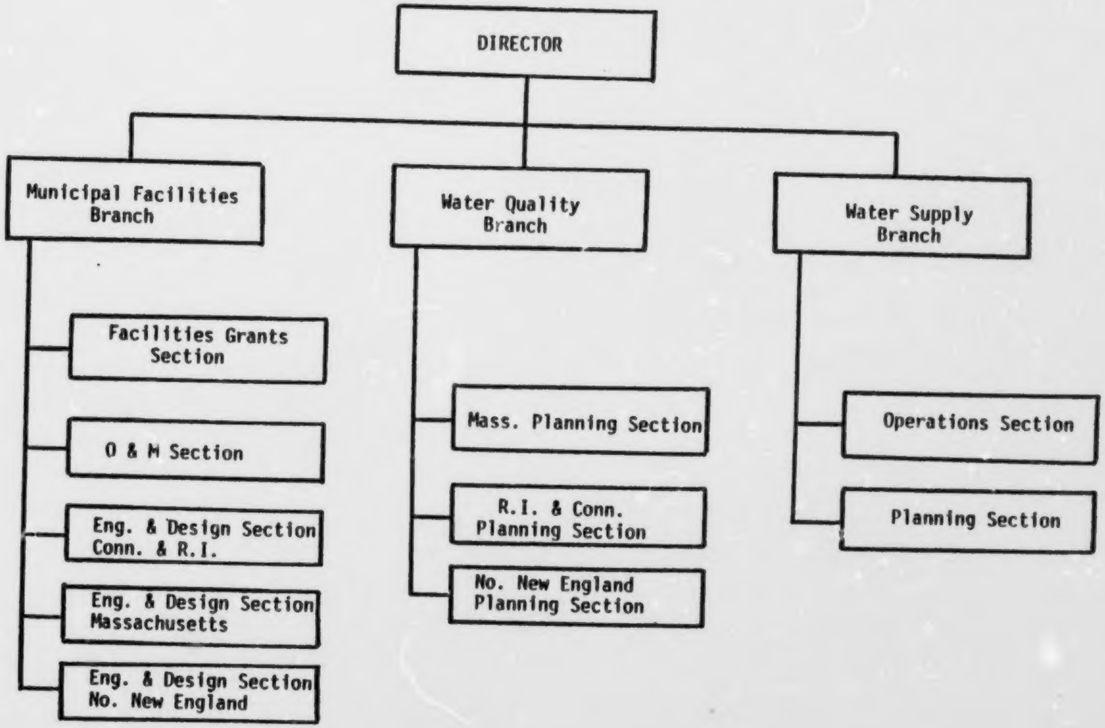
Program Planning and Development Branch
Support Services Branch
Systems Analysis Branch
Financial Management Branch
Grants Administration Branch

EPA REGION I

WATER DIVISION

Figure 6.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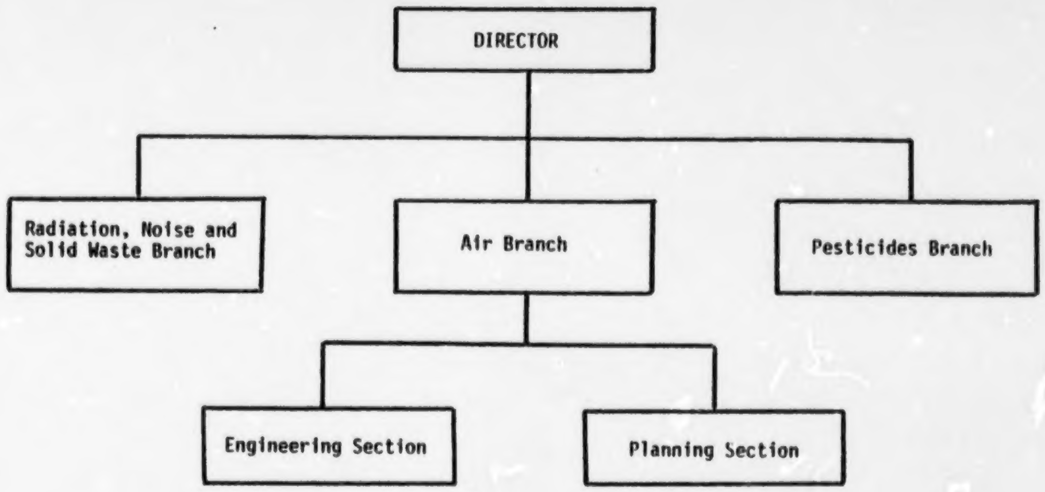
Water Quality Branch
Water Supply Branch
Facilities Grants Section
O & M Section
Eng. & Design Section Conn. & R.I.
Eng. & Design Section Massachusetts
Eng. & Design Section No. New England
Mass. Planning Section
R.I. & Conn. Planning Section
No. New England Planning Section
Operations Section
Planning Section

EPA REGION I

AIR AND HAZARDOUS MATERIALS DIVISION

Figure 7.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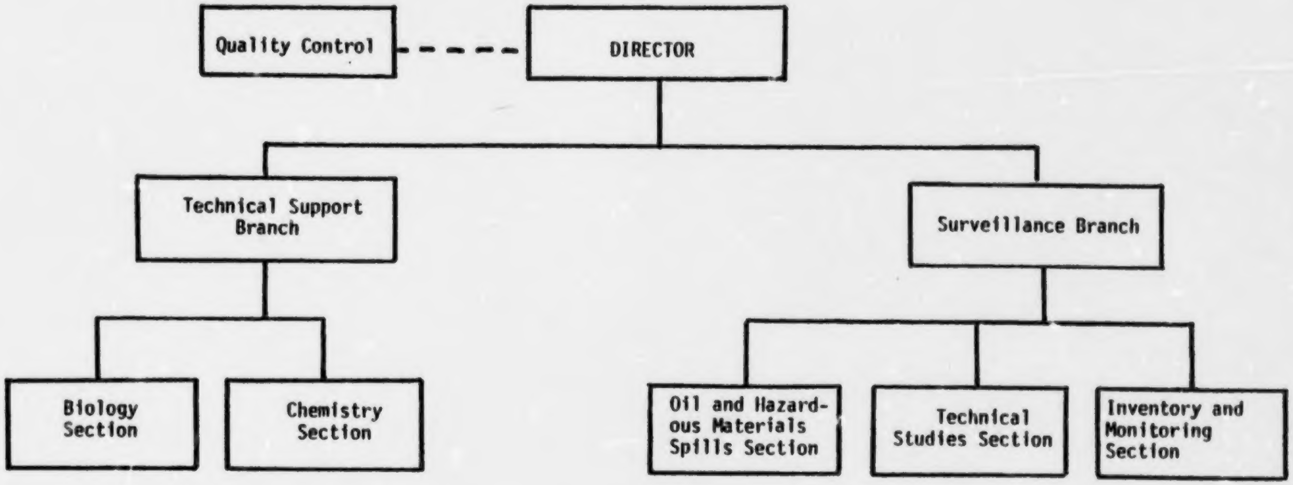
Air Branch
Pesticides Branch
Engineering Section
Planning Section

EPA REGION I

SURVEILLANCE AND ANALYSIS DIVISION

Figure 8.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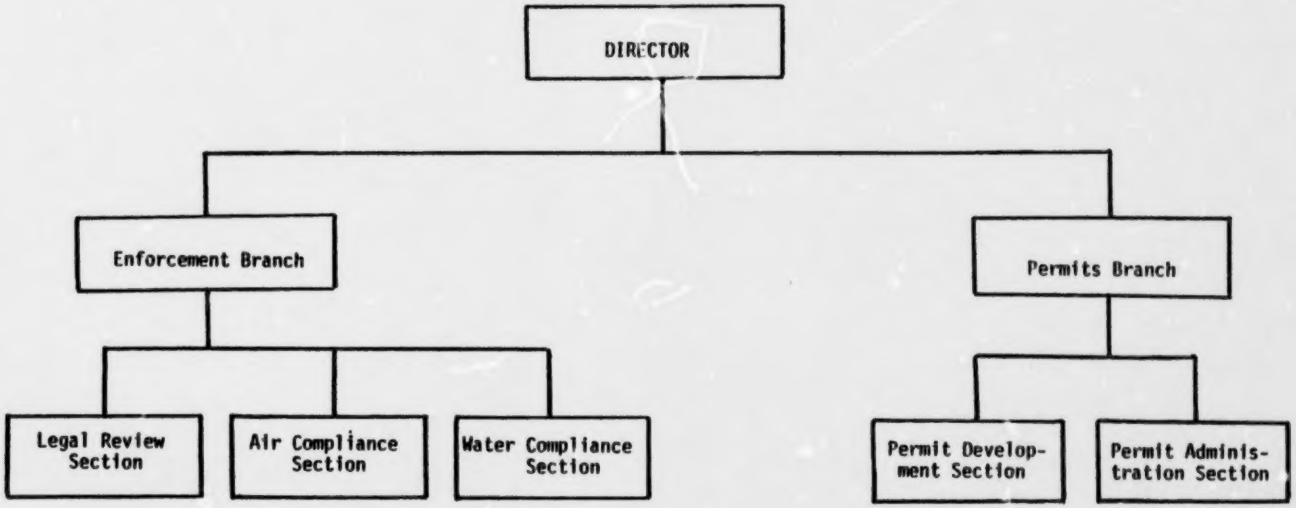
Biology Section
Chemistry Section
Oil and Hazardous Materials Spills Section
Technical Studies Section
Inventory and Monitoring Section

EPA REGION I

ENFORCEMENT DIVISION

Figure 9.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Enforcement Branch
Permits Branch
Legal Review Section
Air Compliance Section
Water Compliance Section
Permit Development Section
Permit Administration Section

Figure 10.

STAFFING LEVEL FIGURES FOR U.S. EPA REGION I

FULL TIME	1975	1976
Engineer	109	111
Attorney	8	6
Administrative	53	59
Clerical	78	72
Computer Specialist	2	2
Accountants/Consultant	4	3
Technician	13	16
Scientist	45	49
TOTALS	312	318

PART TIME	1975	1976
Student Trainee	16	27
Student Aide	12	12
Summer Aide	2	10
TOTALS	30	49

ALL EMPLOYEES	1975	1976
TOTALS	342	367

Regional Pollution Control and Abatement Programs

20

I. AIR

A. Workforce Profile

Region I EPA's air program presently provides the principal coordinative efforts for implementation of national program plans in the region which specifically address the problems associated with point and non-point source air pollution. These efforts are focused solely toward the attainment of ambient air quality standards. Activities which have been established to approach the realization of these levels of air quality are as follows:

1. Planning, coordination, and advisory activities which address individual state program requirements;
2. Technical assistance activites and program grants which aid State program needs;
3. Assistance to states in developing comprehensive State Air Implementation Plans (SIP) as well as transportation control plans.

Anticipated program developments in the future will be directed toward the final development and enforcement of thorough and reliable state air implementation plans. In addition, the program will augment its present field capabilities concerned with ambient air quality and emissions level monitoring through more intensive field investigations as necessitated under a sound SIP. New source control will be addressed to a greater extent as well as problems associated with the recognition of additional toxic pollutants as the development of new standards and regulations to control these pollutants come into effect.

As an indication of Region I's commitment to transfer program responsibilities to the states within its domain, both the New Source Performance Standards (NSPS) and the National Emission Standards for Hazardous Air Pollution (NESHAPS)have been delegated, in part, to four of the states within the region: Connecticut, Maine, Massachusetts, and New Hampshire. The Clean Air Act provides that authority for administration and enforcement of standards promulagated under both NSPS and NESHAPS may be given to the states, although EPA retains cooperative enforcement authority.

The current staffing level of the air pollution abatement and control program in Region I is shown in the following table.

TABLE I
REGION I AIR POLLUTION CONTROL

Current (1976) Staffing Level

Position	1976
Engineer	
Environmental	11
Sanitary	1
Environmental Protection Specialist	9
Statistician	1
Student	4
Clerical	4
TOTAL	30

B. Workforce Projections

Available information seems to point toward more than normal growth in the regional air activities as far as workforce is concerned. Sources suggest that the program will sustain a moderate growth rate of 15 percent per annum due to the increased emphasis and responsibilities being placed on the SIP programs for the states.

Turnover rate has been almost nonexistent in the past two years, which generally evidences a number of things. First, the federal pay wage is generally higher than those which are currently scheduled in the six New England states. The benefits and job security associated with federal employment tend to overshadow those benefits which can be derived through private employment with, for instance, air pollution consulting engineering or high technology equipment manufacturing firms. However, sources in the field say that there currently is a very limited private job market for environmental engineers which underscores the negligible program attrition rate.

The following table represents an average growth through 1981 and depicts a compromise growth rate between the program's zero growth needs and its absolute hard needs. This was determined in part from personnel interviews as well as various planning documents supplied by the agency. Using 1976 as a base year, a fifteen percent per annum rate was used to project air staffing levels through 1982.

TABLE II

EPA REGION I

Air Pollution Control
Workforce Projections to 1982 (est.).

POSITION	1976	1977	1978	1979	1980	1981	%/annum turnover (average)	%/annum growth/decline (average)
Engineer	12	14	15	17	20	23	n/a	15%
Administrative	5	6	7	8	9	10	n/a	15%
Clerical	4	5	5	6	7	8	n/a	15%
Scientist	5	6	7	8	9	10	n/a	15%
Student	4	5	5	6	7	8	n/a	15%
TOTALS	30	36	39	45	52	59	n/a	15%

C. Training and Certification

Region I employees have access to training courses offered by Research Triangle Park (RTP) located in North Carolina through its Air Pollution Training Institute. Courses are offered both at RTP, as well as within the 10 regional headquarters of EPA. The institute offers short-term courses for EPA employees involved in the field of air pollution control, as well as numerous technical seminars and workshops addressing specific needs. Course content for these offerings centers around augmenting the present capabilities of regional program staffs to ensure effective management as well as sufficient technical background within their specific regional program area. The scope of offerings ranges from introductory level to highly technical courses designed to meet the needs of personnel with little or no experience as well as individuals with extensive experience in air pollution control. Tuition charges for attending lecture courses is $22.00 per day and $35.00 per day for laboratory courses. Table III depicts the chronological schedule of courses and their contents to be offered during 1976 and 1977 at EPA Region I headquarters.

The Institute awards Continuing Education Units (CEU) for the satisfactory completion of its classroom and laboratory courses. The Continuing Education Unit is a nationally recognized standard unit of measurement for non-credit continuing education. One CEU is awarded for every ten hours of participation in a continuing education program. CEU's are based on the number of contact hours (lecture or laboratory) and not on the number of days involved. The CEU is used by many colleges and universities, as well as in a number of technical, industrial, professional, governmental, and association training programs.

To be eligible for CEU credit awarded by the Air Pollution Training Institute, participants must attend a minimum of 95% of all scheduled class and laboratory sessions and satisfactorily pass examinations based on studies and assignments. The Institute maintains records of CEU credits awarded each individual and will continually update this record as additional units are earned through Institute courses. Certificates are awarded to those students who satisfactorily complete all course assignments and attend all scheduled presentations.

Participation in courses offered by the Air Pollution Training Institute in Region I has not been extensive. Only 20 individuals from state and local agencies in the region attended courses during 1976. Table IV

TABLE III

CHRONOLOGICAL SCHEDULE OF COURSES OFFERED IN REGION I BY THE AIR POLLUTION TRAINING INSTITUTE FOR 1976-1977

Date	Course Number and Title	Days
August 9 - 12	431 - Air Pollution Control Technology	4
October 18 - 21	413 - Control of Particulate Emissions	4
February 14 - 17	415 - Control of Gaseous Emissions	4
March 28 - 31	435*- Atmospheric Sampling	4
April 25 - 28	450*- Source Sampling for Particulate Pollutants	4

* Laboratory Course

Source: U.S. Environmental Protection Agency, Air Pollution Training Institute, Chronological Schedule of Courses, July, 1976 through June, 1977.

TABLE IV

PARTICIPATION OF STATE AGENCIES IN COURSES OFFERED BY THE AIR POLLUTION TRAINING INSTITUTE

Region I Final Cumulative Analysis for Fiscal Year 1976

State	Number of Students
MAINE	4
MASSACHUSETTS	10
NEW HAMPSHIRE	1
RHODE ISLAND	1
VERMONT	3
TOTAL	19

Source: Registrar, Air Pollution Training Institute is included to give a breakdown of participation by state. No table is included for local government participation as only one individual from New Haven, Connecticut, comprised this category. As Table V shows, 89 individuals attended courses in Region I. Of these 89 individuals, 69 represented federal offices, universities, industry and consultants.

Additionally, preliminary estimates by the Air Pollution Control Institute suggest that during fiscal year 1978, a variety of short-term technical training courses will be offered in the Boston area. Table VI depicts course numbers, titles, and duration of these potential offerings in Region I.

Other recent training programs concerned with air pollution abatement and control within Region I include an agreement by EPA with the states of Connecticut, Massachusetts, and Rhode Island to fund a program to train instructors in motor vehicle emissions control. The funds will be used to train instructors in specific techniques of motor vehicle emissions testing. In turn, these individuals will be responsible for incorporating these techniques into community vocational high school curricula as well as continuing education programs for auto mechanics. It is hoped that as these states develop inspection and maintenance programs for antipollution devices on motor vehicles, there will be an adequately trained workforce which can recognize violations of federal emissions standards and take necessary corrective action to ensure that all vehicles equipped with pollution control devices meet the prescribed federal standards. Incorporation of these techniques into the curriculum offerings is expected to be completed by July 1977.

TABLE V

TOTAL PARTICIPATION* IN COURSES OFFERED BY THE AIR POLLUTION TRAINING INSTITUTE

Region I Final Cumulative Analysis for Fiscal Year 1976

State	Number of Students
CONNECTICUT	9
MAINE	10
MASSACHUSETTS	63
NEW HAMPSHIRE	1
RHODE ISLAND	2
VERMONT	4
TOTAL	89

*Includes federal agencies, state agencies, local agencies, universities, industry and consultants from Region I.

Source: Registrar, Air Pollution Training Institute

TABLE VI

POTENTIAL SHORT TERM TECHNICAL TRAINING COURSES THAT ARE PROJECTED TO BE OFFERED BY THE AIR POLLUTION TRAINING INSTITUTE IN REGION I DURING FISCAL YEAR 1978

Course Number and Title	Days
413 - Control of Particulate Emissions	4
415 - Control of Gaseous Emissions	4
423 - Diffusion of Air Pollution - Theory and Application	4½
426 - Statistical Evaluation of Air Pollution Data	4
456 - Regional Planning for Air Pollution Control Officers	3
458 - Air Pollution Administration I	2
459 - Air Pollution Administration II	3
- Special course yet to be specified	-

Source: U.S. Environmental Protection Agency, Air Pollution Training Institute, FY 1978 Preview.

The Air Program within the Region recognizes that training is a critical need within the agency due to advancing technology as well as the growing complexities involved in regulating a growing list of hazardous pollutants. The present method of funding in-house training programs is the responsibility of the air program in the region. Each year money must be set aside to meet these training obligations; however, as fiscal constraints become greater as well as increased program responsibilities, training will likely be the first item reduced. To date, efficient planning has allowed this program to secure adequate funds to train its personnel on an extremely limited basis. Future plans call for the acquisition of two workforce development and training specialists for the program; however, their responsibilities will be to the states to create a program from which less experienced regional air program personnel could potentially derive some benefit.

Another situation which creates a training approach-avoidance conflict is an understaffed program. If responsibilities under the air program grow, which there is every indication that they will; and if additional personnel are not acquired to supplement these added program responsibilities at this level of commitment, regional sources feel that time spent in training would be at the cost of maintaining a minimally acceptable air program within the region. But if an adequate staff is on hand to efficently implement the air program within the region and at the same time sufficient time is allowed for each employee to acquire regular training, then the increased expertise accrued form such training would, in effect, have a multiplier effect on the program enabling it to attain greater proficiency for implementing those regulations and programs mandated by congress.

Other types of training available to EPA air personnel in Region I include informal inhouse training for new employees as well as upgrade employees. Additionally, Boston as the academic center of the Northeast, has a variety of excellent universities and colleges which offer both introductory and advance training in air pollution control technology. The Civil Service Commission also offers various management courses which serve not only all the programs within the agency, but also other programs in other agencies within the region.

Training sponsored by EPA for the state air programs might be classified at this time as having a severly limited degree of success. The present mechanism of offering training within the states is centered around a cost recovery, self supporting concept. The money used to finance training for state personnel usually comes from the money which has been granted to them by EPA to support their particular state air program. Due to the fact that EPA is not receiving additional funds for this grant program, and at the same time is urging the states to assume greater and greater responsibilities, the end result is that training costs incurred by the states are for operating a minimally acceptable program.

A program should be developed whereby the states can recieve training at no cost to them. Presently some funding is available for further education in air pollution control technology and program management through the New England Consortium on Air Pollution; however, this program is sponsored by EPA primarily for graduate students pursuing a career in air pollution control who have not yet entered the workforce. This program, however, does direct itself to meeting the needs of state and local agencies as a means of placing capable students into the state programs or internships. Some money is also available to state personnel pursuing further formalized education; however, funding under this consortium seems to be sporatic and minimal. Those directors within the state which have utilized interns under this consortium speak very highly of the capabilities of the students placed in their state program, as well as the valuable temporary staffing supplement, which in fact proved to be very productive for the specific air program. They recommend that such a program is extremely valuable and should be developed more fully in the immediate future.

D. Career Potential

Air pollution control career opportunities within the regional air program will be centered around the acquisition of additional individuals who are well versed in both management and planning as well as knowledgeable in specific aspects of air pollution control engineering. Careers in this area will be involved in New Source Control reviews, assistance to states on specific control or program planning problems, as well as monitoring state and regional activities. Due to the degree of complexity associated with these activities, a bachelor's degree augmented by considerable experience or education in program planning, monitoring, and design would be a prerequisite to employment. Enforcement and monitoring activities are also expected to grow and result in a greater demand for additional scientific and technical personnel.

There will also be new career opportunities for manpower development and training specialists who will be responsible for intensifying both regional and state training programs.

As stricter regulations and standards are promulgated over the next five years for carcinogenic and toxic air pollutants, increasingly more highly trained technical people will be needed in both research and monitoring to develop sound sampling and review methodologies to support actions initiated by the agency.

Over the next five year period, the overall enforcement and monitoring workforce will grow at a quicker pace than will the abatement and control aspects of the air program in Region I. Attaching specific growth numbers to the previously mentioned potential career growth areas would be speculative. However, over the next five years, enforcement and monitoring activities (labor intensive) will grow at a quicker pace than will the managerial aspects of abatement and control in the air program in Region I.

E. Conclusion

In assessing the current situation in regard to supply and demand for career openings in the field of air pollution control, there are generally more applicants for openings than there are unfilled positions. However, this statement is somewhat misleading. In reality, there are fewer qualified applicants for position openings than there are openings. This disparity stems from the fact that upgrade training for regional personnel does not have the emphasis it should. If a top level position opens, demanding considerable expertise, ideally it should be filled by an individual in-house which would create a carryover effect down to a typical entry level position. In turn, this entry level position would probably be filled by an individual just entering the workforce. Currently, due to lack of training courses which enable a degree of professional upward mobility, there is a stagnation of lower level professionals. As a result, when a new, highly sophisticated position opens, it cannot be filled in-house, thus there is no carryover effect down to the entry level career positions, resulting in limited career opportunities for those wishing to enter the workforce.

II. NOISE

A. Workforce Profile

The Noise Control Act of 1972 directs the Environmental Protection Agency to serve as the principal coordinator of all federal noise programs and to provide state and local governments with the necessary technical assistance to abate adverse noise levels within their jurisdictions. Assistance to the six New England states of Region I is provided by the noise program of the Air and Hazardous Materials Division, and generally has been directed toward encouraging state and local governments to develop noise control programs of their own. It is hoped that through the development of non-federal programs, the agency's effort in enforcing promulgated noise abatement regulations can be supplemented by state and local initiative. However, due to the current void in federal funding available for support, progress to date has been less than significant as state and local governments generally place noise in an accepted nuisance category.

The noise program of Region I EPA is currently operating at a limited level. It is staffed by one full-time engineer, as well as a part-time consultant, who are both involved in collecting noise data throughout the region for use in developing national noise standards. Identification of regional problems in noise pollution is also a function; however, as previously mentioned, there is currently no federal granting authority within the region to develop and implement programs needed to resolve the problems. A major function to date lies in the provision of technical assistance to the various state and local programs within the six state region. An instrument loan program has provided some of the states in the region with sophisticated acoustical equipment to monitor and study noise levels within their jurisdictions. Field studies are also carried out by the regional personnel to learn more about the problems associated with the abatement and control of hazardous noise levels. Additionally, acoustical expertise is provided to the Region's Environmental and Economic Impact Office when a technical review of a noise assessment contained within an Environmental Impact Statement (EIS) is needed.

As state and local noise abatement programs and enabling legislation have been left to state and local initiatives, Table VII is included to provide a brief overview of progress to date in the establishment of municipal noise ordinances. Additionally, Table VIII is included to give a brief idea of state legislative initiatives. Once again it should be noted that the existence of these statewide noise restrictions is not necessarily complemented by an adequate field enforcement workforce. Finally, Table IX is included to give an idea of the state and region-wide populations served by municipal noise ordinances. Most of these individuals live in larger metropolitan areas as Table IX indicates, leaving eighty percent of the New England population subject to potentially excessive unregulated noise levels.

TABLE VII

Region I
Municipal Noise Ordinances - 1976*

Jurisdiction	1970 Population	Nuisance	Zoning	Vehicle	Rec/Vehicle	Railroad	Aircraft	Construction	Building
CONNECTICUT									
Berlin	14,149	0	X	-	-	-	-	-	-
Bridgeport	156,542	X	X	X	-	-	-	X	X
Farmington	14,390	X	X	X	-	-	-	-	-
Hartford	158,017	0	-	-	-	-	-	-	0
New Haven	137,707	0	X	-	-	-	-	-	-
Stonington	15,590	0	X	-	-	-	-	-	-
Westport	27,414	-	X	-	-	-	-	-	-
MASSACHUSETTS									
Acton	14,770	-	0	-	-	-	-	-	-
Boston	641,070	X	X	X	-	-	-	-	-
Concord	16,148	0	-	0	0	-	-	0	-
Fall River	96,898	0	0	-	-	-	-	-	-
Milford	19,352	-	X	-	-	-	-	-	-
Newton	91,263	0	-	0	-	-	-	-	-
Pittsfield	57,020	X	-	X	-	-	-	-	-
Springfield	163,905	0	X	-	-	-	-	-	-
Worcester	176,572	0	-	-	-	-	-	-	-
NEW HAMPSHIRE									
Berlin	15,256	0	-	-	-	-	-	-	-
Concord	30,022	0	-	-	-	-	-	-	-
Manchester	87,754	0	-	-	-	-	-	-	-
RHODE ISLAND									
Cranston	74,287	-	X	-	-	-	-	-	-
East Providence	48,151	-	X	-	-	-	-	-	-
Pawtucket	76,984	X	X	-	-	-	-	X	X
Providence	179,116	0	-	-	-	-	-	-	-
Warwick	83,694	-	X	-	-	-	-	-	-

*Key: X Regulation includes acoustical criteria.
0 Regulation does not include acoustical criteria.
- No regulation.

Source: Sound and Vibration, December, 1976: Clifford R. Bragdon, Georgia Institute of Technology

TABLE VIII

REGION I
State Noise Regulations - 1976

State	Motor Vehicle Mufflers	Motor Vehicle Sound Level Limits	Motorcycle Sound Level Limits	Off-Road Recreational Vehicle Sound Level Limits	Snowmobile Sound Level Limits	Motorboat Mufflers	Motorboat Sound Level Limits	Property Line Sound Level Limits: Status	Property Line Sound Level Limits: Relationship to Local Noise Ordinances
CONNECTICUT	--	X	X	X	X	--	--	May adopt regs.	State must approve local noise ordinances
MAINE	X	--	--	--	X	X	--	--	--
MASSACHUSETTS	--	--	--	X	X	--	--	Have adopted reg. prohibiting "unnecessary emission" of noise.	--
NEW HAMPSHIRE	--	--	--	X	X	--	--	--	--
VERMONT	--	--	--	--	X	--	--	--	--

Source: Sound and Vibration, December, 1976; Article by Fred G. Haag, New York State Department of Environmental Conservation.

TABLE IX

Population Served by Municipal Noise Ordinances in Region I*

State	Population Served	% of Total Population
CONNECTICUT	523,809	17%
MASSACHUSETTS	1,276,998	22%
NEW HAMPSHIRE	133,032	18%
RHODE ISLAND	462,232	49%
TOTAL	2,396,071	20%

*All figures based on 1970 census.

Program developments in the Regional Noise Program over the next five years will tentatively address the following areas:

(1) Assistance to state and local agencies in the development of state and community noise ordinances.

(2) Federal facility noise abatement and control program development.

(3) Studies in support of regional and national standards and regulations development.

The Region tentatively will move to implement two programs addressing local noise abatement and control activities: the Quiet Communities Program (QCP) and Each Community Helps Others (ECHO) Program. The QCP program will be composed of a limited number of communities chosen to demonstrate a comprehensive approach to community noise control. In turn, the ECHO program will assist a select number of QCP participants, as well as other communities with proven noise control programs, in providing neighboring municipalities with on-site assistance to develop programs of their own. The extent of the two aforementioned programs in Region I has yet to be determined; however, it is anticipated that sometime in late 1977 funding will become available for implementation. Specifically, additional personnel resources required by EPA Region I will remain indeterminable until the programs are defined for the New England area. Additionally, eventual federal regulations may require that airports within the region, which have scheduled interstate air carriers, develop airport noise abatement plans. These plans would delineate specific programs to reduce the impact of aviation related noise on the communities in the vicinity of the airports. In turn, EPA would be charged with providing the necessary technical expertise to aid in the development of these plans.

It appears that overall noise abatement and control activities will continue to be the primary responsibility of state and local authorities. EPA's role in this respect will be limited to assistance in the development of model ordinances and informational materials to be utilized by these individuals.

The following table examines product regulations, labeling, and special local determinations which will be proposed by EPA. Additionally, it is expected that noise emission standards will be proposed for snowmobiles, tires, lawnmowers, new light vehicles, chain saws, air conditioners, rock drills, pavement breakers, and earthmoving equipment. In turn, the states in Region I will be encouraged to establish complementary enforcement programs to monitor owner operation and maintenance of all noise attenuating devices on those products regulated by EPA. Additionally, individual states within the Region may extend noise emission standards to products not currently regulated by EPA; however, in cases of EPA regulated products, state adopted guidelines must conform with federal standards.

B. Workforce Projections

The outlook for growth in the noise control program in Region I is tenuous at best. Individuals within the program suggest that, in terms of workforce, the program will remain somewhat static over the next five years, if past policies and priorities are indicative of the future. Two additional full-time acoustical engineers would at this time augment the program to an optimal level; however, the acquisition of these specialists would be considered one of the lowest priorities within the entire regional staffing outlook. More than likely, these positions will be gradually added to the program over the next five year period as the extent of federal regulations grows and the program becomes a more viable and recognized entity. However, as portrayed in the workforce profile, EPA does aspire to a comprehensive noise strategy at [illegible]l levels of government which can only be effected by a cadre of trained professionals at all levels. In turn, this group of experts can only derive its existence from financial support appropriated by Congress and authorized by EPA.

TABLE X

EPA Noise Regulations Currently Under Consideration

Regulations	Description	Expected Publication Date in Federal Register
MAJOR NOISE SOURCES		
Motorcycles	Establishment of noise emission standards applicable to all new products in each of these categories.	March '77
Solid Waste Compactors		February '77
Truck Transport Refrigeration Units		February '77
Wheel and Track Dozers		February '77
Buses		March '77
LABELING		
Hearing Protectors	Establishment of regulations requiring labels to contain information on noise attenuation characteristics of product.	February '77
SPECIAL LOCAL DETERMINATIONS		
Interstate Motor Carriers	Establishment of procedures permitting adoption of special state and local rail and motor carrier regulations when necessitated by special local conditions.	March '77
Railroad Noise Emission Standards		March '77

Source: Pollution Engineering, January, 1977.

At this point in time, noise is becoming a demanding environmental pollutant while public awareness and acknowledgement is lacking. To project a substantial rate of growth for a program such as noise, which lacks realistic legislative directives and appropriations, would be speculative at this time. Technical assistance without financial backing to state and local governments is philosophically sound but cannot be expected to work as smoothly as projected in EPA's noise strategy documents. Despite the fact that a variety of new regulations and programs are proposed, grant authorizations must accompany these initiatives in order to develop an adequate noise workforce at all levels of government in Region I as anticipated by EPA strategists.

C. Training and Certification

Currently, the only formal training program at the regional state or local level consists of a Regional Noise Workshop which provides state and local officials with introductory and technical training in environmental noise pollution. The workshop is conducted by the professionals of Region I's Noise Program in Boston and generally is of a two to four day duration. To supplement these training sessions, in July, 1975, EPA published "Guidelines for Developing a Training Program in Noise Survey Techniques" which proposes a model state plan for training community noise technicians to assist local authorities in the enforcement of federal, state, and local noise control laws. However, it is not certain to what extent, if any, the states within Region I have utilized the concept of this proposed training strategy. There are also courses offered by the University of Massachusetts, the Massachusetts Institute of Technology, and other select universities which lead to a bachelor's or master's degree in acoustics. These course offerings represent the present formalized noise training spectrum in the region. Informal training offered by the region to state and local officials comes in the form of technical assistance, and is generally offered at the request of the individual in need of such assistance.

Future considerations for offering formal training courses by regional personnel to state and local officials are presently limited due to the lack of comprehensive funding to accomplish such endeavors. There has been expressed, however, a need to train officials at the local level who currently are not particularly informed on the particulars of noise abatement and control or enforcement. Nationally, EPA will enlist the services of its Noise Enforcement Facility at NASA's Plum Brook Station in Sandusky, Ohio, to train regional, state, and local personnel in enforcement techniques and requirements. However, participation by state and local officials of Region I is anticipated to be limited unless EPA intends to provide for costs incurred in travel and tuition. Direct, decentralized delivery is essential to the success of any noise service which EPA offers the states, if it expects these services to impact a large number of localities. Based on the present, extremely limited funding allocated by the states and communities to their noise programs, it is unlikely that state and local noise officials from Region I will participate to any extent in any centralized training program located outside the immediate vicinity of New England. However, if the QCP and ECHO programs impact communities in Region I, the training outlook for this area will be heightened considerably.

Training and certification in noise pollution control at all government levels will remain uncertain over the next five years unless a concerted effort is made to upgrade the level of noise control through discretionary funding and necessary regulatory growth. At the current minimal workforce and responsibility level, all training requirements for EPA Region I personnel can be satisfied adequately by acoustical engineering courses offered in colleges and universities throughout Region I. Graduates of these programs currently provide an abundant supply of personnel for any new positions in noise control programs within New England government.

D. Career Potential

New careers in the noise control program of EPA Region I will generally be of a professional nature and will most likely require an acoustical engineering background coupled with some experience or training in regulatory program operation. However, current appraisals of the job market seem to indicate that there exists a surplus of individuals with these particular qualifications in the New England area due to layoffs in state programs. Thus, with the highly restricted workforce growth projections in noise, future career potential seems to be extremely limited at best. Most new and emerging careers will be in the manufacturing industries as the current thrust of federal noise regulations requires these industries to produce quieter products and meet occupational noise exposure standards. Design engineers as well as mechanical engineers involved in developing new, quieter products will be needed. Additionally, health physicists, with backgrounds in occupational noise abatement, will be needed to help the private sector comply with the present and anticipated safety and health noise standards. There will also be a career potential for professionals proficient in the design of noise abating retrofits for equipment which currently produces excessive auditory levels.

E. Conclusion

The Noise Control Program of Region I has been a subordinate function of the region's pollution abatement and control effort and will remain so until the public demands federal initiatives requiring a concentrated effort in this area. As the commercial level of noise grows, so will EPA's regulatory directives; however, a shift in priorities must be establsihed in order to ensure the success of compliance with these regulations. Only a concentrated effort toward developing a trained workforce in noise control will satisfy a functional nationwide effort. In order to derive this particular labor force at all levels of government, financial assistance to state noise control programs must be available from EPA. As mentioned before, the current thrust of federal noise regulations is to confront the noise problem at its origin--with the manufacturers.

III. PESTICIDES

A. Workforce Profile

The Pesticide Program of Region I EPA is responsible for the implementation of the Federal Insecticide, Fungicide, Rodenticide Act (FIFRA) as amended in the six state region of New England. Specifically, it regulates all pesticide distribution and use-related activities in compliance with FIFRA. One primary activity the program has been concerned with recently is the development, review, and approval of state plans for implementing Certified Pesticide Applicator Programs (private and commercial) in conjunction with designated state lead agencies, as well as state Cooperative Extension Services of the United States Department of Agriculture (CES-USDA). This program determines those individuals who possess the necessary skills and expertise to apply restricted use pesticides. Currently, EPA has listed 81 pesticide ingredients on their "Candidate Chemicals for Restricted Use" list which represents roughly 6% of all active ingredients registered with the agency. Currently, applicator certification programs in Region I are addressing those training prerequisities necessary for applying those pesticides which have tentatively been selected by EPA for restricted use only.

In the area of pesticide registration, the regional pesticide program is charged with the responsibility of monitoring manufacturer compliance with the registration and labeling requirements of FIFRA statutes, the Region can issue a Stop Sale Order. Additionally, a recall of a suspect chemical can be issued at any time followed by an indepth inspection of the manufacturer's records to verify allegations brought against the product.

Region I EPA is in the process of negotiating agreements with the six states within its jurisdiction. Upon securing approval for cooperation, the subsequent information generated concerning pesticide accidents gathered from the states will be entered into a nationwide computer program, the Pesticide Episode Review System (PERS), which has been developed to analyze problem trends and characteristics of pesticides involved directly and/or indirectly in all types of accidents.

Ancillary activities of the Pesticide Branch include pesticide accident investigations, pesticide product sampling, issuance of Experimental Use Permits, general technical assistance to state and local agencies, and field studies concerned with the identification and reduction of potential pesticide related hazards.

Activities in the future will center around four basic areas which the program sees as top priority. The first will involve an increased effort for the registration of special local needs and experimental use permit programs. Coupled with this will be an increase in technical assistance provision to state agencies so that all federally-initiated state programs can achieve independent operational levels. Finally, two areas which will experience further development in the program as mentioned previously will be efforts regarding pesticide episode investigation as well as activities in pesticide residue profile analysis.

One anticipated problem which the regional program is concerned with is EPA's tenuous long-term commitment to its applicator certification grant-in-aid program. Continued financial assistance will be needed over the upcoming years to provide for maintaining state plan requirements which call for some form of re-examination or update training at various intervals as the composition of EPA's restricted use list changes. New entry applicators will also call for continued certification program operation during the interim years, and professionals in the field believe that any move to terminate this current program funding could result in drastic alterations of state commitments to the maintenance of applicator certification plans.

If a recommended approach of decentralization and extensive delegation of authority to the regions is adopted over the next five years, then a total reallocation of priorities and staffing levels will result. This decentralization appears to be imminent and long overdue, and in the best interests of the program once the immediate deadlines of FIFRA have been met. The current staffing level of Region I's pesticide branch is shown in the following table.

TABLE XI

REGION I PESTICIDE PROGRAM

Workforce Projections to 1982 (est.)

Position	1976
Consumer Safety Officer	5
Ecologist	1
Entomologist	1
Agronomist	1
Clerk/Typist	2
TOTAL	10

B. Workforce Projections

The Pesticide Program of Region I has had a rather stable employment level, around ten individuals for the past year, and it is anticipated that this workforce will remain the same in the immediate future. These individuals are broken down into a group of eight professionals and two administrative support individuals. The future of the workforce level in this program is presently confronted with two possible alternative approaches to expansion, the need for which have been established in-house. Both are dependent on an affirmative or negative decision on a current plan to decentralize the EPA Office of Pesticide Programs in Washington. As stated earlier, this office possesses about 77% of all personnel currently involved in the agency's pesticide programs, leaving only 23% in regional offices. When one views only the abatement and control activities of EPA's pesticide program and leaves out all enforcement activities, it is found that only 11% of the entire federal workforce is regionally located. Individuals in the field currently explain that this concentration of workforce lends itself to a less effective state delivery system of services, due to the fact that the delegation of program authority to the regional offices can at best be limited.

The first approach to developing any sort of workforce projections would be to assume that the relative distribution of activities and workforce will remain at current levels. In this case, then, the Region I program would most likely experience an increase of three professional positions over the next five years. These individuals would need to possess credentials in basic pesticide efficacy and toxicology as well as a good background in program administration. In addition, if the pesticide accident investigation program is to be reinforced, any individual placed in this position would need basic training in accident investigative techniques as well as a liberal knowledge of pesticide epidemiology.

If an affirmative decision is made regarding the proposed decentralization policy which, based on current strategies, would not be practical until current FIFRA deadlines are adequately met, then an assessment of regional workforce increases is more difficult to ascertain. In one respect, however, qualifications needed by professionals relocated into the regions would not substantially deviate from those currently required by positions in the Washington Headquarters program.

In regard to the actual workforce increases in the Region I pesticide program, it is likely that a decentralization plan similar to the ones currently maintained by EPA's Water and Air Programs would be followed. In these programs, over half of all individuals are located outside of Washington, D.C., ranging from a low of 48% (air) to a high of 81% (water). Due to the Product Registration activities of EPA, and the need for a somewhat centralized national approach to this aspect of pesticide regulation, it would be safe to assume that any attempt to decentralize would result in placing approximately half of all pesticide personnel at the regional level. This would tentatively result in an increase in staffing level for Region I of an additional 12 to 15 individuals. It should be noted, however, that if such a situation develops, it would not occur until the basic implementation aspects of FIFRA are well under way, possibly beyond the five year scope of this study.

C. Training and Certification

Pesticide certification and training activities represent the major thrust of Region I's program activities. The Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA) as amended requires that all individuals involved in the supervision of the application of restricted use pesticides be trained, examined, and certified in compliance with minimum federal standards. This applies to those individuals applying restricted use pesticides for profit, designated as commercial applicators, as well as those individuals involved in applying restricted use pesticides privately, designated as private applicators (usually farmers). Commercial applicator certification is somewhat more rigorous in its requirements, however. Presently, FIFRA calls for the completion of licensing activities by October of 1977.

Applicator training in Region I is being conducted through the United States Department of Agriculture's Cooperative Extension Service (USDA-CES) in cooperation with state and EPA agents. This arm of USDA, which has numerous stations in every state, was determined to be the most effective delivery mechanism for providing the necessary on-site facilities and personnel to train and certify pesticide applicators. To date in Region I approximately 4,500 private applicators have been certified and licensed under this system as well as an additional 1,500 commercial applicators. Projections provided by EPA officials estimate that about 14,535 private applicators will require certification, as well as 10,650 commercial applicators in the New England area by October, 1977. This total represents over 25,000 individuals; however, on a national level it is projected that Region I will only be involved in the certification of 1.5 percent of all applicators. A statistical breakdown of this estimate shows that out of the entire pool of commercial applicators to be certified, Region I's figures represent only 5% of the total. In the area of private certification, Region I's certification program will include only about 1% of the nation's total.

Training statistics for Region I can be seen in the following three tables. It should be noted that the summary numbers shown do not represent the number of certified applicators. All figures indicate the number of participants in individual applicator training sessions on a cumulative basis. For instance, one individual might elect to receive training in more than one licensing category; thus, this individual would be counted more than once in these figures. Additionally, it should be noted that some states which maintained certification requirements prior to FIFRA, and whose previous standards meet current federal requirements have established a "Grandfather Clause" whereby those individuals with active state licenses have immediately qualified for federal licenses, exempting them from training and testing requirements. The following tables merely show the bulk of training needed, and the figures are not necessarily proportional in any way to the number of certified pesticide applicators.

Table XII shows the current status of commercial applicator training. Approximately 53 percent of it is complete. On a national scale the commercial applicator training activities represent about three percent of the national average. Table XIII, in turn, represents the extent of private applicator training activities in Region I and shows that the process is almost half complete. The total private applicator training participants

TABLE XII

STATUS OF COMMERCIAL APPLICATOR TRAINING AS OF JANUARY 1, 1977

REGION I

State	Anticipated Total Training Participants by October, 1977	Numbers Trained as of January, 1977	Numbers Still to be Trained by October, 1977
CONNECTICUT	1,160	1,005	155
MAINE	920	560	360
MASSACHUSETTS	2,200	1,045	1,155
NEW HAMPSHIRE	818	318	500
RHODE ISLAND	645	245	400
VERMONT	769	269	500
TOTALS	6,512	3,442	3,070

Source: Regional Support Branch, Operations Division, Office of Pesticide Programs, U.S. Environmental Protection Agency

in Region I represent one percent of the national total. Region I has completed 50 percent of this training activity, which is well ahead of the national average of fifteen percent. Finally, Table XIV summarizes the status of all pesticide applicator training activities in Region I, showing that over half of all training requirements have been met; this compares favorably to a national average of only 25 percent. In all, total training activities (private and commercial) in Region I represent about one and a half percent of all anticipated pesticide training participation nationwide.

TABLE XIII

STATUS OF PRIVATE APPLICATOR TRAINING AS OF JANUARY 1, 1977

REGION I

State	Anticipated Total Training Participants by October, 1977	Numbers Trained as of January, 1977	Numbers Still to be Trained by October, 1977
CONNECTICUT	1,407	1,282	125
MAINE	5,140	3,140	2,000
MASSACHUSETTS	3,300	1,567	1,733
NEW HAMPSHIRE	1,483	933	550
RHODE ISLAND	484	234	250
VERMONT	4,192	792	3,400
TOTALS	16,006	7,948	8,058

Source: Regional Support Branch, Operations Division, Office of Pesticide Programs, U.S. Environmental Protection Agency

Completion of the bulk of certification activities is tentatively scheduled for October 1977. Thereafter, applicators will be required to become recertified at varying intervals depending upon the requirements of individual state plans. To pursue this situation somewhat further, with respect to the workforce necessary for the continuation of state applicator certification activities in the future, let us assume that a state requires relicensing and/or retraining activities for certified applicators every four years to keep applicators up to date on application techniques of new restricted use pesticides issued by EPA.

TABLE XIV

STATUS OF COMMERCIAL AND PRIVATE APPLICATOR TRAINING AS OF JANUARY 1, 1977

REGION I

State	Anticipated Total Training Participants by October, 1977	Numbers Trained as of January, 1977	Numbers Still to be Trained by October, 1977
CONNECTICUT	2,567	2,287	280
MAINE	6,060	3,700	2,360
MASSACHUSETTS	5,500	2,612	2,888
NEW HAMPSHIRE	2,301	1,251	1,050
RHODE ISLAND	1,129	479	650
VERMONT	4,961	1,061	3,900
TOTALS	22,518	11,390	11,128

Source: Regional Support Branch, Operations Division, Office of Pesticide Programs, U.S. Environmental Protection Agency

Based on the current number of individuals involved in the initial training phase of all private and commercial applicators during the past year, the recertification activities within this state would require an instructor workforce at about 25 percent of the current level. In order to accomodate applicator workforce growth, an additional 8 percent of the current state training and certification staffing levels would be required. Thus, in this instance, for the certification program to remain operational for the maintenance aspect of licensing and recertification roughly 33 percent of the current training staff available would be needed on a permanent basis.

At present, plans are being developed to accomodate new entry-level applicators who must be certified during the interim periods. It is anticipated that the magnitude of new entries will represent an annual increase of 8% of the existing active certification pool. Table XV is included as a professional estimate of workforce growth for private and commercial applicators in Region I. Attrition has not been included and will not become apparent until the first state relicensing phases are initiated. Until then, the numbers in this table represent an estimate of those individuals in New England who will hold active applicator licenses for restricted use pesticides.

TABLE XV

NEW ENGLAND CERTIFIED PESTICIDE APPLICATORS

Workforce Projections to 1982 (est.)

	1976	1977	1978	1979	1980	1981	%/annum growth (average)
Private	4,500	14,535	15,698	16,954	18,310	19,775	8%
Commercial	1,500	10,650	11,502	12,422	13,416	14,489	8%
TOTAL	6,000	25,185	27,200	29,376	31,726	34,264	8%

A training program to address the growing problem of how to diagnose and treat acute pesticide poisonings of migrant farm workers has been initiated by EPA in cooperation with the Bureau of Community Health Service, Department of Health, Education and Welfare. The intent of the program is to provide basic operative instruction to health care personnel in the area of pesticide intoxication identification and emergency medical procedures. The need for such a program is a result of the extreme difficulty in differentiating pesticide poisonings from other work-related illnesses or conditions exhibiting similar symptoms. Too many times this leads to a delay in administering proper treatment through an initial misdiagnosis.

The initial phase of the project was completed during the summer and early fall of 1976 with courses being offered throughout the migrant farm worker routes. The target audience for instruction included emergency medical care personnel; health clinic nurses; doctors; health care workers from federal, state, and local public health agencies; and private clinics which have an emphasis on migrant health care. The course has been submitted for accreditation in support of continuing education credit. Presently the course meets the criteria for ten hours of credit in Category I for the Physicians Recognition Award of the American Medical Association (AMA).

Four sites were chosen for the introductory training workshops, with Philadelphia serving as the principal location for those migrant health care workers in Regions I, II, and III. The extent of participation of medical personnel from the New England area has not yet been determined; however, in the future, this innovative occupational health program may escalate into a more extensive program addressing specific state and local needs concerning occupational pesticide exposure, possibly beyond the migrant spectrum.

Regarding training available to individuals working in the pesticide program of Region I EPA, it is expected that each individual should possess a working knowledge of all functions of the program. This is generally provided through informal in-house discussion and education. Formalized regional pesticide training does not exist at this time, other than occasional headquarters-sponsored workshops or seminars. It is generally the opinion of individuals in the branch, however, that they possess adequate credentials in the field of pesticide abatement and control.

In regard to administering regulatory functions, it was expressed that there is an urgent need to develop formal training workshops and seminars at the federal and state levels to ensure a proper understanding of the operation of federal pesticide programs. There was also expressed a need to develop formal investigative techniques and formats for pesticide episode investigations. All these training needs result primarily from the fact that individuals in the program are knowledgeable in the technical and scientific aspects of pest control, but lack thorough management backgrounds to efficiently administer a federal pollution program.

D. Career Potential

Career potential at the federal level will be limited to a few positions necessitating backgrounds in pesticide chemistry; however, the primary area of new positions will most likely call for individuals possessing a general knowledge of pesticide abatement and control with an emphasis on administration and management qualifications. All these areas of career potential in Region I will be extremely limited for the next five years unless a decentralization of EPA headquarters staff occurs.

The major area of non-federal career potential as viewed by the regional officials, will come in the form of a drastic personnel increase in state pesticide programs due to expanding responsibilities in certification of applicators. Compared to what presently exists these increases will be upwards of 500% per state; although in most instances, due to present skeletal staffing patterns, this percentage increase will translate numerically into personnel increases ranging from two to seven employees per state.

One area of significant career potential which must be mentioned is integrated pest management, commonly referred to as IPM. It represents an approach to pest control which specifically addresses causal factors behind pest infestations. Through an integrated approach to pest management, including cultural control, mechanical-physical control, biological control, the use of resistant varieties, sanitation and legal controls, it is the expressed intent of IPM that the use of pesticides be limited and used only in conjunction with the aforementioned methods. The potential for career development in IPM at present cannot be accurately forecasted due to a limited priority placed on its development. However, if EPA moves to develop this approach to pest control, then it is generally believed that an immediate demand for IPM specialists, as well as training, will be created. The users of large quantities of pesticides will see that to limit the use of these products will result in substantial savings in operating expense.

E. Conclusion

Observations by individuals within Region I and evidence obtained from various planning documents point to a growing concern over the centralization of the federal pesticide program. It is said that directives established by Headquarters do not address the problems peculiar to Region I, thus providing the regional and state pesticides program with a final product of little or no value.

As it presently stands, program response and assistance by EPA to the states have been classified by some as being less than adequate. This is a result of a staffing level inconsistent with regional obligations and responsibilities. However, as evidenced earlier, the regional office should logically assume greater responsibilities under FIFRA to serve the state programs more effectively.

Finally, the development of Integrated Pest Management has the potential for revolutionizing accepted practices of pest control. EPA has assumed the dominant role in initiating such a program; however, the agency has not pursued this field to any practical extent. As it continues to limit the uses of more and more pesticides through cancellations, suspensions, and restrictions, alternative methods will have to be looked at closely due to the inevitability of a curtailment in availability of effective pesticide products.

Professionals in the field believe and support the proposition that the time has come for EPA to take the initiative in developing and delivering a national Integrated Pest Management strategy to provide the agricultural industry with an economically sound alternative to the agency's imposition upon them of a reduction in pesticide availability.

This proposed program integrated into the present applicator certification program could result in a remarkably innovative and beneficial strategy of best available technology in pest control. It would serve as a practical and responsible alternative to EPA's increasing regulatory restrictions on pesticide use. At the same time it would curb the flow of toxic substances into our environment and create additional skilled jobs.

IV. POTABLE WATER

A. Workforce Profile

The Water Supply Program in Region I has the responsibility for planning and implementing regional water supply and hygiene programs with particular emphasis on the Safe Drinking Water Act (SDWA) of 1974, and its effect on public water supplies throughout the six state region. The program works closely with each of the six New England states to upgrade their potable water supplies through ongoing program support grants which provide additional state positions under SDWA. Currently Region I is distributing about 1.1 million dollars under this grant-in-aid program. The Water Supply Program of Region I also provides technical assistance in areas concerning the public health and hygiene aspects of water supplies and advises state agencies of provisions and standards of SDWA. Attempts to upgrade water supply practices by working with states and surveillance of public and private water supplies are also carried out by EPA to ensure that all citizens are served by adequate sources of safe drinking water in compliance with federal drinking water standards. The current staffing level for EPA Region I Water Supply Program is depicted in table XVII. These individuals are divided between an Operations Section and a Planning Section within the Water Supply Branch of the Water Division.

TABLE XVI

REGION I WATER SUPPLY

Current (1976) Staffing Level

Position	1976
Engineer Sanitary	7
Chemist	2
Aquatic Biologist	1
Environmental Health Technician	1
Clerk/Typist	2
TOTAL	13

Note: 1 chemist and 1 sanitary engineer are on loan to the states of Maine and Vermont respectively, bringing Region I headquarters staffing level to 11 full-time positions.

In New England alone there are about 2,500 public water supplies regulated by SDWA which serve approximately 83 percent of the New England population. The following table provides a brief analysis of the various populations served by these supplies.

TABLE XVII

REGION I PUBLIC WATER SUPPLIES

Population Served	No. of Supplies
Less than 1,000	1,900
1,000-10,000	400
Over 10,000	200
82% of New England	2,500

Additionally, it should be noted that two million people in the rural areas of New England are not covered under the provisions of SDWA.

During the previous year the regional water supply program has effected a substantial reduction in lead content in the older distribution systems which serve cities in and around the metropolitan area of Boston. The program has also improved the bacteriological quality of the water supplies within the region. The problem of a growing road salt contamination of supplies, which is somewhat of a unique problem to New England, has leveled off and plans are currently being implemented to ensure a continued reduction. Future activities regarding water supply contamination will revolve around the control of volatile organic compounds in selected water supplies.

Priorities for the ensuing years will be directed toward insuring that all six New England states accept primacy for implementing provisions and regulations under the Safe Drinking Water Act. To aid the states in this function, the region will provide additional surveillance and analysis support as well as technical assistance as the workload and complexity increases. As the non-community sources of potable water are identified and inventories, they will come under the rules and regulations of SDWA. This will most likely occur sometime in 1979 and will result in a shifting of regional workscopes and priorities towards more of an administrative and review function due to the fact that many towns and non-community supplies will encounter financial difficulties upgrading their supplies to federal standards. In addition, variances and exemptions from the Act and its accompanying regulations will be requested and will result in additional administrative procedures by the agency.

Anticipated regional activities during FY 1978 are expected to be broken down into a two-part scheme comprised of the following categories:

I. Public Water Systems Supervision Programs.

II. Underground Injection Control Programs.

Category I, Public Water Systems Supervision Programs, is composed of the following tasks to be performed by Region I during late 1977 through the end of 1978.

I. Public Water Systems Supervision Program (PWSS)
   1.) Review and approve grant applications;
   2.) Monitor grants to ensure a timely and thorough utilization of funds;
   3.) Assist in conducting a national mid-year evaluation of state programs to measure the progress of the New England states in achieving the goal of safe drinking water;
   4.) Inform states of grant reallocations and ensure that the requirements of regulations are satisfied;
   5.) Conduct public information programs to reach individual citizens, suppliers of water, injection facility operators, and state officials in Region I;
   6.) Coordinate with other regional programs.

Priorities in this program will be broken down as follows:

#1 - Exercise primary enforcement responsiblity for Public Water Systems Supervision Programs
   A.) Implementation of the PWSS program in states without primacy;
   B.) Implementation on federal facilities where states have more stringent standards than federal standards;
   C.) Implementation on Indian Reservations.

#2 - Continue assistance to states without primary enforcement resonsibility for PWSS
   A.) Support state efforts to obtain primacy;
   B.) Assist in the development, expansion, or modification of existing state water supply programs;
   C.) Provide technical assistance in the implementation of current state water supply programs.

#3 - Initiate a review of variances and exemptions granted by states with primary enforcement responsibility
   A.) Examine documentation by suppliers of water to support requests for variances and exemptions;
   B.) Evaluate state adherence to its established procedures for granting exemptions and variances.

#4 - Ensure the compliance of interstate conveyances with the Interim Primary Drinking Water Regulations
  A.) Coordinate program implementation with regional FDA personnel;
  B.) Collect and analyze samples on conveyances to determine compliance;
  C.) Provide technical assistance to operators and owners of interstate conveyances;
  D.) Conduct compliance monitoring or arrange for monitoring to ensure that water source meets the regulations in those states without primacy.

The second category of activity in Region I will involve the Underground Injection Control Program which is directed towards ensuring the integrity of New England's underground water supplies. The following activities are expected to be addressed in this program during FY 1978.

II. Underground Injection Control Programs (UIC)
  1.) Development of an Automatic Data Processing System (ADP) for the UIC program;
  2.) Assistance in review of existing state legislative needs;
  3.) Preliminary planning for EPA implementation of UIC programs in states without primacy;
  4.) Completion of the inventory of Injection facilities.

Priorities for Region I in this program will be broken down into the following order:

#1 - Technical assistance to those states in New England designated as requiring Underground Injection Control Programs
  A.) Evaluate existing state programs, legislative authorities and regulations to determine changes or modifications necessary for the state to qualify for primacy for the UIC program;
  B.) Assist in the development of necessary legislation and/or regulations to qualify the state for primacy;
  C.) Assist states in developing implementation plans for primacy;
  D.) Provide guidance to the states in the preparation of grant applications;
  E.) Provide information packages, and, in cooperation with state agencies, conduct discussions with injection facility owners/operators on requirements of the regulations and impact of regulations on their operations;

F.) Assist states in the development of permit issuance procedures and rule documentation requirements;
G.) Provide technical program support to the states during public hearings;
H.) Facilitate state participation in training programs and special program support projects.

#2 - Liaison and assistance to non-designated states
A.) Establish and maintain a channel of communications to nondesignated states;
B.) Work with states in developing the capability and programs that will enable them to assume primacy when designated;
C.) Undertake assistance activities similar to those provided to states designated.

B. Workforce Projections

Region I's Water Supply Program has grown considerably less than those of other regions in the past years due to the fact that the program has provided reimbursed personnel to the Army Corps of Engineers and permanent personnel loans to the states in the region. Since the inception of the Safe Drinking Water Act in December of 1974, the program has grown at the headquarters level by only two positions--those being engineers. The region does recognize the needs of the states and should be considered a forerunner of personnel decentralization towards increased state responsibilities and participation in program planning. This idea of state assignments shows that EPA Region I recognizes the need for state delegations of authority in order to ensure a successful assumption of primacy by the six New England states.

Growth of the next five years will be somewhat minimal at the federal level. It is foreseen that three additional positions will be needed in the Water Supply Program by 1982. Currently the program is basically a group of sanitary engineers with administrative capabilities and this composition is not expected to change in the future. The three new positions will be for engineers, and they will be engaged in activities pertaining to inventorying as well as state program administration. The underlying assumption behind this growth estimate is that all the states within the region will assume primacy for the Safe Drinking Water Act. At this point in time that appears to be a very reasonable assumption.

Over the next five years it is anticipated that workload increases will occur during the winter of 1978 as smaller towns become unable to meet interim regulations due to the lack of resources needed to finance necessary corrective alterations to existing facilities. As the program approaches June of 1979, when all non-community courses meet regulations set forth under the Act, the workload will again increase to accomodate necessary reviews for exemptions, variances, and assistance. It has been determined that an addition of twelve individuals from now until 1982 would be considered an optimum level of commitment, however, this appears unlikely due to the agency's own commitment to reduce its side. It is reasonable to assume, however, that the program will not be cut back and that three additional permanent positions will be added over the next five years. It would also be safe to say that during peakload operations in 1978 and 1979 the program will experience a temporary increase in staffing levels either through temporary reassignments of individuals within other regional programs or through limited appointments of temporary personnel.

In an effort to provide for adequate resources in the state water supply programs of New England the Water Supply Program has forecasted the following scheme of anticipated monitoring and workforce needs for implementing SDWA for fiscal year 1976 through 1978. Table XVIII depicts these needs and it should be realized that these estimates generally can be assumed to represent actual potential program growth rather than unrealistic optimum program needs.

C. Training and Certification

Most training for the Water Supply Program employees of Region I is centered around the technical training involved in basic water treatment and is currently deemed adequate in a minimal sense. Generally each employee is exposed to some type of training twice a year, and usually these courses or seminars are conducted outside of EPA by organizations such as the American Water Works Association (AWWA) and local colleges and universities in the Region I area (generally in the metropolitan Boston area). Administrative and clerical training is offered by the Civil Service Commission (CSC) of Region I and serves to augment basic skills; however, it does not approach actual water program content. Informal in-house training is also an integral part of the Water Supply Program and is represented primarily by the exchange of ideas and information through discussions and meetings within the program office in Boston.

Training currently offered state and local environmental employees by U.S. EPA has come in two forms. The first involves the SDWA grant-in-aid program under which a state may apply for a certain amount of training monies to be utilized by its employees to attend workshops sponsored by groups such as EPA or AWWA as well as courses sponsored by

TABLE XVIII

EPA REGION I STATE COST AND WORKFORCE ESTIMATES FOR SAFE DRINKING WATER ACT IMPLEMENTATION FISCAL YEARS 1976 TO 1978

State	State Share	Federal Grant	Total	Person years
FY 76 (April 1976 - September 1976) - FINAL				
Connecticut	$176,488.	$ 91,700.	$268,188.	10.5
Maine	$106,631.	$ 75,000.	$181,631.	13.2
Massachusetts	$361,117.	$113,200.	$474,317.	21.6
New Hampshire	$ 73,885.	$ 75,000.	$148,885.	8.0
Rhode Island	$ 26,500.	$ 75,000.	$101,500.	8.6
Vermont	$ 88,100.	$ 75,000.	$163,100.	10.8
	$832,721.	$504,900.	$1,337,621.	72.7
FY 77 (October 1976 - September 1977) - TENTATIVE				
Connecticut	$353,000.	$183,400.	$536,400.	26.5
Maine	$213,200.[a]	$150,000.	$363,200.	21.2
Massachusetts	$666,600.[a]	$226,400.	$893,000.	47.6
New Hampshire	$163,000.	$150,000.	$313,000.	16.0
Rhode Island	$ 53,000.	$150,000.	$203,000.	16.3
Vermont	$176,200.	$150,000.	$326,200.	22.5
	$1,625,000.	$1,009,800.	$2,634,800.	150.1
FY 78[b] (October 1977 - September 1978) - ESTIMATED				
Connecticut	$353,000.	$230,000.	$ 583,000.	28.5
Maine	$213,200.	$210,000.	$ 423,200.	24.2
Massachusetts	$660,600.	$340,000.[c]	$1,000,000.	53.6
New Hampshire	$163,000.	$200,000.[c]	$ 363,000.	18.0
Rhode Island	$ 53,000.	$160,000.[d]	$ 213,000.	16.3
Vermont	$176,200.	$210,000.	$ 386,200.	24.5
	$1,619,000.	$1,350,000.	$2,968,400.	165.1

[a] Information from FY 77 grant application. Other state shares assumed same as FY 76.

[b] Assumes work with community systems throughout FY78. No allowance for staff required to handle non-community systems in FY 79.

[c] Estimate based on conversation with state official.

[d] Estimate limited by 25% matching share.

local colleges and universities. Generally the SDWA State Assistance Grant Program is the only mechanism under which state employees can obtain access to training funds. In most states in the northeast the state agency often has little if any money available for upgrading and diversifying the educational backgrounds of its employees. The explanation for this stems from the fact that there is not enough money available from the state to adequately finance the operations aspect of the Water Supply Program, let alone an employee training program. The second, and less obvious aspect of training offered by EPA to the states involves placement of regional personnel into the State Water Supply Programs through temporary assignments. This method allows permanent state program personnel to receive extended firsthand informal training in all aspects of federal water rules and regulations and gives the state programs immediate access to the skills and knowledge which the agency requires to carry out responsibilities mandated by the Safe Drinking Water Act. This procedure also provides EPA with a more thorough understanding of state program limitations, thus serving as a field training experience for EPA personnel.

Finally, this last section provides an overview of water supply training programs offered by the secondary, vocational, undergraduate, and graduate institutions in New England. The information presented was gathered by the Water Programs Manpower Office and is presented in Table XIX. The listing is not meant to be complete, but merely an attempt to show that training offered at the operator level is limited whereas educational offerings at the undergraduate and graduate level are rather comprehensive.

TABLE XIX

SELECT WATER SUPPLY TRAINING PROGRAMS IN NEW ENGLAND

Type of Educational Program	Sponsoring Agency	Duration and/or degree
CONNECTICUT		
Water Ecology (emphasis on water, wastewater, treatment systems, and drinking water)	Farmington High School	One course/day
Environmental Science and Technology (emphasis on wastewater, water, air, environmental management, and solid waste)	Hartford Graduate Center	Master of Science
Civil Engineering (emphasis on soil, water, wastewater, and solid wastes)	University of Connecticut Grad School at Storrs	Master of Science in Civil Engineering, B.S. in Civil Engineering
Master of Science in Environmental Studies (emphasis in water treatment, wastewater treatment, and air pollution)	University of New Haven, West Haven	Master of Science in Environmental Science
MAINE		
Environmental Problems (water, air, wastewater, energy)	Cony High School	Fifteen weeks/ evenings, adults
MASSACHUSETTS		
Civil Engineering (Environmental) with emphasis on air, ocean, wastewater, water, solid waste	University of Massachusetts, Amherst	Bachelor of Science/ day
Civil Engineering Technology (emphasis on wastewater systems, water supply, and field work)	Wentworth Institute Boston	Associate in Engineering
Environmental Technology Program (train students for employment in water, air, wastewater, solid waste, and noise abatement)	Northern Essex Community College in Haverhill	Associate in Science/ day
Environmental Technology Program (train students for employment in water, wastewater, and wetlands management)	Essex Agricultural & Technical Institute	Associate in Applied Science

TABLE XIX (Continued)

Type of Educational Program	Sponsoring Agency	Duration and/or degree
MASSACHUSETTS continued		
Master of Science in Environmental Studies (emphasis in laboratory, water, wastewater, air, solid waste)	University of Lowell	Later afternoon, evening, Master of Science
Civil Engineering (emphasis on wastewater, water, plant design)	Tufts University, Medford	Bachelor of Science in CE, Master of Science in CE
Environmental Technology (with options in water, wastewater, air, and solid waste)	Springfield Technical Community College, Springfield	Associate in Environmental Technology
Environmental Engineering and Science (emphasis on wastewater, sanitary engineering, lab, water, and plant design)	Worcester Poly Tech.	Bachelor of Science
Civil Engineering (environmental control) with emphasis on wastewater, sanitary engineering, lab, water, and plant design	Worcester Poly Tech.	Bachelor of Science, Master of Science, day or evening
Civil Engineering (emphasis on water, wastewater, soil)	Worcester Junior College	Associate in Science in Civil Engineering
NEW HAMPSHIRE		
Water and Wastewater Treatment Plant Operator Training in Laboratory Testing and Techniques	N.H. Water Supply and Pollution Control Commission, Concord	10 weeks, EPA funded
Civil Engineering (emphasis on water, wastewater, and soil)	University of N.H., Durham	Bachelor of Science in Civil Engineering
VERMONT		
Civil Engineering (environmental engineering emphasis on water, wastewater, air pollution, and solid wastes)	University of Vermont, Burlington	Bachelor of Science and Master of Science in Civil Engineering
Environmental Studies (emphasis on water, environmental science, lab, environmental management)	Johnson State College, Johnson	Bachelor of Science in Environmental Studies
Civil Engineering (emphasis on water, wastewater, and soil)	Vermont Technical College, Randolph Center	Associate in Applied Science in Engineering

TABLE XIX (Continued)

Type of Educational Program	Sponsoring Agency	Duration and/or Degree
CORRESPONDENCE COURSES		
Correspondence Course Manual for Water Plant Operators	Clemson Correspondence 401 Rhodes Center Clemson University Clemson, S.C. 29631	Covers South Carolina Certification Levels C&D

It has been suggested that EPA's three-phase Water Supply Training Strategy, as mentioned previously, will augment the current lack of comprehensive operator training curricula in Region I.

D. Career Potential

Career potential in Region I's Water Supply Program will be limited over the next five years; however, this absence of growth is by no means indicative of growth within the field at the state and local level. Primarily, new positions to be staffed within the program in Boston will be of a professional nature and will be involved in surveillance and analysis aspects of state programs as well as technical assistance to the six state water supply programs in successfully implementing all provisions under the Safe Drinking Water Act of 1974. Currently, additional professional needs are anticipated with the advent of an Underground Injection Control Program (UIC); however, to actually forecast specific power needs and functions at this point in time would be beyond the realm of speculation. It appears likely, though, that expertise will be needed in the form of professionals with combined backgrounds in hydrology, geology, soil science, and sanitary engineering. As stated before, the major impact of career potential will occur at the state and local level due to the fact that the thrust of this act is geared toward state primacy and self-sufficiency.

E. Conclusion

The Water Supply Program of Region I will most likely not experience a dramatic increase in workforce over the next five years. However, as the program's activities become more defined and developed, the major impact of program and workforce growth will be directed toward the state water supply programs within the region. Estimates to date suggest that these efforts by the region to upgrade existing state programs will result in an overall doubling of state personnel by 1979 as the regulations mandated by the Safe Drinking Water Act of 1974 come into effect. Financial resources to enable these workforce increases will most likely be provided through increased Safe Drinking Water grants-in-aid. Coupled with these increases will be a concerted effort to develop and organize specific training programs which address the needs of the states as they assume a more dominant role in the implementation of the act.

Another point worth mentioning is the impact that toxic substance awareness will have on the program. As more and more of these potential carcinogens are recognized and regulated, there will be a need to address problems associated with monitoring water supplies for toxic contamination. The impact of this will most likely occur well beyond five years from now; however, if toxic substance monitoring is required for our nation's water supplies, a large career potential will develop for public water toxicologists.

V. RADIATION

A. Workforce Profile

The radiation program in Region I EPA is currently staffed by a single physicist and a half time professional engineer and is located within the Radiation, Noise, and Solid Waste Management Branch of the Air and Hazardous Materials Division. The program currently serves the six states of New England in an advisory capacity. Responsibilities and priorities of the program are ordered as follows:

1. Conduct the technical review and review management of conventional nuclear power plant Environmental Impact Statements;
2. Implement the radiological portion of the EPA Drinking Water Standards in support of the Water Supply Program;
3. Perform environmental reviews of radiological aspects of selected Federal activities;
4. State and other technical assistance:
   a. Provide technical and program consultation and assistance to states where required
   b. Respond to public and Congressional inquiries
   c. Stimulate productive functioning of Regional Training Committees to meet state training needs
   d. Facilitate and coordinate Office of Radiation Programs activities with states
   e. Participate in EIS reviews of non-conventional nuclear activities;
5. Obtain, compile, and report technical information on selected nuclear and radiation facilities;
6. Assist states in the development, testing, evaluation, modification, and maintenance of state radiological emergency response plans. In addition, provide regional radiological emergency response coordination should such an emergency occur within the region;
7. Pursue activities related to implementation of future EPA radiation standards and guidance, such as generally applicable environmental standards for the uranium fuel cycle and Federal Radiation Guidance in the medical use of radiation and in occupational exposures to radiation; and,

8. Develop projects cooperatively between Headquarters and the region which relate to current and specific radiation problems within the region.

In addition, EPA possesses regulatory authority in overseeing all aspects of public and environmental protection from excessive doses of ionizing and non-ionizing radiation. Responsibilities of the program also extend to monitoring uses which are not strictly environmental in nature such as medical and occupational uses.

Broadly speaking, EPA is mandated by Congress to reduce the overall exposure of the public to all types of radiation by establishing safe standards and regulations. Enforcement responsibility possessed by EPA for regulating radiation sources, however, is limited to drinking water standards, discharges into navigable waters, and ocean dumping of radioactive wastes alone. All other standards and criteria promulgated by EPA are the enforcement responsibilities of other agencies including the Nuclear Regulatory Commission (NRC), the Energy Research and Development Administration (ERDA), the Department of Labor (DOL), and the Department of Health, Education, and Welfare (HEW). Table XX gives a complete breakdown of the enforcement responsibilities of EPA and other federal agencies and Table XXI briefly summarizes their related missions, Finally, Table XXII is included to provide an overview of EPA radiation authorities.

This fragmentary approach to radiation abatement and control has generated a degree of uncertainty concerning responsibilities and implementation authorities. As was seen in Tables XXI and XXII, EPA has broad authority for setting standards; yet this authority does not continue

TABLE XX

ENFORCEMENT RESPONSIBILITIES FOR MAJOR PROGRAM AREAS

PROGRAM AREA	RESPONSIBLE AGENCY			
	Environmental Standards or Guidance	Effluents or Other Plant Specific Limits	Equipment Performance Standard	Enforcement
Uranium Fuel Cycle Facilities	EPA	NRC	---	NRC
Ocean Dumping Radioactive Waste	EPA	EPA	---	EPA
Radioactive Waste Disposal	EPA	ERDA NRC States	---	NRC States
Water Effluent of Natural Radioactivity	EPA	EPA	---	EPA
Medical Radiation	EPA	DHEW States	DHEW States	Fed. Agencies States
Occupational Exposure	EPA	OSHA (DOL)	---	Fed. Agencies OSHA (DOL) States
Plutonium Cleanup and Restoration	EPA	---	---	Federal Agencies
Drinking Water Standards	EPA	---	---	EPA/States
Nonionizing Radiation	EPA	---	DHEW	Federal Agencies

Source: EPA Office of Radiation Programs, Radiation Protection Program Strategy, October 1976.

TABLE XXI

THE FEDERAL GOVERNMENT'S ROLE IN RADIATION PROTECTION

AGENCY	RESPONSIBILITIES
Environmental Protection Agency (EPA)	Is responsible for overseeing all aspects of radiation protection including both ionizing and non-ionizing radiation. This includes not only environmental radiation, but also medical X-rays as well as occupational uses of radiation. The agency is also responsible for advising states on development of radiological emergency response plans and also insures that appropriate regulatory actions are initiated when needed. In addition, EPA is responsible for specifying the limits of radioactivity in drinking water.
Energy Research and Development Administration (ERDA)	Is responsible for developing the nation's nuclear weapons systems and for conducting research and development activities towards the development of nuclear energy sources.
Health, Education and Welfare (HEW)	Has radiation responsibilities under the Food and Drug Administration (FDA) of the Public Health Service (PHS). Specifically FDA is charged with determining the limits of radioactivity in food as well as reducing the exposure of man to hazardous ionizing and non-ionizing radiation. It also develops standards for safe limits of radiation exposure; develops methodologies for controlling radiation exposures; conducts research on health effects of radiation exposure; and conducts an electronic product radiation control program to protect public health and safety, including the development and administration of performance standards to control the emission of radiation from electronic products. These activities are carried out primarily by the Bureau of Radiological Health (BRH) of FDA.
Nuclear Regulatory Commission (NRC)	Is responsible for licensing and regulating nuclear facilities as well as the possession, use, processing, transport, handling, and disposal of nuclear materials. It also insures that safety and environmental concerns are adequately met as well as security matters. Agreements are also established with select state radiation programs regarding the regulation of certain nuclear materials within their jurisdictions. The commission also regulates radioisotopes used in medical research and therapy.

Sources: 1976/77 United States Government Manual, Office of the Federal Register, and "Radioactive Wastes", U.S. Environmental Protection Agency.

TABLE XXII

EPA RADIATION AUTHORITIES

	Federal Guidance	Standards & Criteria	Monitor/Inspect	Enforcement	Report/Plan	Environmental Impact Review	Technical Assistance	Research
Atomic Energy Act	X	X						
Federal Water Pollution Control Act of 1972		X	X	X			X	X
Solid Waste Disposal Act					X			X
Safe Drinking Water Act of 1974		X		X			X	X
Clean Air Act		X		X		X		
Public Health Service Act (42 USC 241 - Section 301)			X				X	X
Marine Protection, Research and Sanctuaries Act of 1972		X	X	X		X	X	X
National Environmental Policy Act - Section 102C						X		
Executive Order 11752		X			X		X	

Source: EPA Office of Radiation Programs, Radiation Protection Program Strategy, October 1976.

into the enforcement and implementation area. These particular aspects are handled by a wide variety of agencies working in some cases quite independently from one another. Consequently, professionals within EPA's headquarters office working in radiation have been confronted with a degree of uncertainty which is affecting the agency's long term strategy commitments. This uncertainty about future responsibilities places the agency in a precarious position due to the fact that its credibility is a direct function of the degree to which its standards are accepted and enforced by the states and other federal agencies.

Professionals at both the state and federal levels have expressed concern over the fragmentation of federal radiation control responsibilities and the varying degrees to which associated problems are addressed by these departments, agencies, and commissions. Some have gone on to suggest that all radiation responsibilities be brought together into one centralized agency so that a consistent national effort for radiation protection can be established.

B. Workforce Projections

The projected five year workforce level for the Radiation Program of Region I EPA will assume a static, no-growth posture according to independent assessments made by professionals within the Regional Headquarters in Boston. In previous years, there has been no real growth in the agency's workforce devoted to radiation activities, and it is expected that with expanding regional priorities concerning air and water quality programs, this trend will most likely continue. In the not too distant past, the region did have a somewhat larger program with limited granting authority for state radiological health programs; however, this financial aid program has since ceased and generally indicates that the region will assume a limited degree of involvement in supporting state radiation activities.

In addition to the current priorities listed in the Workforce Profile, Region I will also undertake a project to define and assess the problem of radon in drinking water in New England to determine the need for including radon standards in the Safe Drinking Water Act of 1974. This special project, together with current activities, defines all major responsibilities which the program will have through 1980.

Other growth predictions by professionals within the agency suggest that EPA's role in radiation will experience a steady increase over the next five years concurrent with the expansion in the use of nuclear power as well as increasing public awareness of the hazards associated with medical, occupational, and naturally-occurring exposure. This expanded use of radiation will result in significant disposal problems.

In substance, the radiation program in Region I will eventually become a priority program of Region I's activities and should create a considerable increase in the professional workforce; however, this most likely will not occur in the next five years. As Table XXIII shows, only one nuclear unit is expected to come on-line by 1981 with the bulk of nuclear power plant growth due to occur between 1982 and 1988.

TABLE XXIII

Time Sequence for On-Line Operation of 11 Proposed Nuclear Generating Units in New England*

	Year Scheduled for Operation													
	1976	77	78	79	80	81	82	83	84	85	86	87	88	TOTAL
Number of units to come on-line	0	0	0	0	0	1	1	3	0	1	2	0	1	9

*Currently there are 7 nuclear units in operation in Region I

Tables XXIV and XXV are included to give state-by-state breakdowns of the numbers of nuclear generating units in operation, under construction, or proposed within the New England area

TABLE XXIV

Summary of New England Nuclear Generating Units in Operation, Under Construction, or Proposed

State	In Operation	Under Construction	Proposed
CONNECTICUT	3	1	0
MAINE	1	0	1
MASSACHUSETTS	2	0	3
NEW HAMPSHIRE	0	1	1
RHODE ISLAND	0	0	2
VERMONT	1	0	0
TOTALS	7	2	7

As stated before, the emphasis on air and water quality coupled with the fact that nuclear power is five years away from rapid expansion in New England, will cause the growth of Region I's regional radiation workforce to remain somewhat dormant in the immediate future.

TABLE XXV

NEW ENGLAND NUCLEAR GENERATING UNITS IN OPERATION

UNDER CONSTRUCTION, OR PROPOSED

Site	Plant Name	Utility	Capacity (Megawatts)	Status	Scheduled Operation
CONNECTICUT					
Haddam Neck	Haddam Neck Generating Station	Connectucut Yankee Atomic Power Company	575	Operational	1968
Waterford	Millstone Nuclear Power Station Unit 1	Northeast Nuclear Energy Company	652	Operational	1971
Waterford	Millstone Nuclear Power Station Unit 2	Northeast Nuclear Energy Company	828	Operational	1975
Waterford	Millstone Nuclear Power Station Unit 3	Northeast Nuclear Energy Company	1,156	Under Construction	1982
MAINE					
Wiscasset	Maine Yankee Atomic Power Plant	Maine Yankee Atomic Power Conpany	790	Operational	1972
Sears Island	Central Maine	Central Maine	1,200	Early Planning Stage	1986
MASSACHUSETTS					
Rowe	Yankee Nuclear Power Station	Yankee Atomic Electric Company	175	Operational	1961

TABLE XXV (Continued)

Site	Plant Name	Utility	Capacity	Status	Scheduled Operation
MASSACHUSETTS (cont)					
Plymouth	Pilgrim Station Unit 1	Boston Edison Company	670	Operational	1972
Plymouth	Pilgrim Station Unit 2	Boston Edison Company	1,180	Under Review	1983
Turners Falls	Montague Unit 1	Northeast Nuclear Energy Company	1,150	Under Review	1986
Turner Falls	Montague Unit 2	Northeast Nuclear Energy Company	1,150	Under Review	1988
NEW HAMPSHIRE					
Seabrook	Seabrook Nuclear Station: Unit 1	Public Service of New Hampshire	1,200	Under Construction	1981
Seabrook	Seabrook Nuclear Station: Unit 2	Public Service of New Hampshire	1,200	Under Review	1983
RHODE ISLAND					
Charlestown	Charlestown Unit 1	New England Electric	1,150	Under Review	1983
Charlestown	Charlestown Unit 2	New England Electric	1,150	Under Review	1985

TABLE XXV (Continued)

Site	Plant Name	Utility	Capacity	Status	Scheduled Operation
VERMONT					
Vernon	Vermont Yankee	Vermont Yankee Nuclear Power Corp.	514	Operational	1972

PRESENT NEW ENGLAND NUCLEAR GENERATING CAPACITY - 4204 MEGAWATTS

ANTICIPATED NEW ENGLAND NUCLEAR GENERATING CAPACITY - 12,936 MEGAWATTS

Sources: Significant U.S. Power Plants In Planning Or Construction, Presidential Task Force on Power Plant Acceleration, National Energy Information Center, Federal Energy Administration, Washington, D.C., July 1, 1976.

Annual Report 1975, U.S. Nuclear Regulatory Commission, 1976; Appendix 1 "Nuclear Generating Units In Operation, Under Construction, Or Planned".

The Economics of Nuclear Power: A New England Perspective, Massachusetts Energy Policy Office, December, 1975.

C. Training and Certification

The Radiation Program of Region I does not offer any formal training in radiation protection to the six New England states. In fact, as an agency, EPA's only role in training comes in the form of an interagency course on radiological emergency response planning offered through the Defense Civil Preparedness Agency Staff College in Battle Creek, Michigan. However, this course is actually coordinated under the auspices of the Nuclear Regulatory Commission (NRC). EPA does offer a variety of films and self-instructional materials providing guidance for dealing with episodes involving the transport of radioactive materials available to state and local governments. Any possibility for future development of formal radiation-related training courses sponsored by EPA is at this time unknown, as EPA is currently attempting to clear uncertainties concerning their responsibilities in radiation protection.

The lead agency in offering training to the state and local governments is NRC. Section 274 of the Atomic Energy Act allows the Commission to delegate to the states regulatory authority over nuclear material shipments in quantities not capable of attaining a critical mass. A state which has a program capable of protecting public health can enter into an agreement whereby it assumes the aforementioned regulatory authority. Currently, there are approximately 25 Agreement States with direct responsibility for over half of the nuclear material licenses issued by NRC. An annual review is conducted to ensure compliance. The Department of Labor also surrenders regulatory authority for occupational safety and health matters once a state is licensed as an Agreement State by NRC.

D. Career Potential

As evidenced by the workforce projections for Region I, EPA's regional Radiation Program will not experience any growth over the next five years. Obviously this negates any possible career opportunities working with EPA's Boston office in the field of radiation abatement and control. Pursuing this problem further, as shown in Tabe XXVII, that there will only be one additional nuclear facility built in New England over the next five years. This unit will be located in Seabrook, New Hampshire, and has thus far encountered considerable pressure from various lobby groups who wish to prevent the location of a nuclear plant in New Hampshire. Most likely this public reaction will result in a further delay beyond the five year scope of this project. Thus, it seems plausible that no new nuclear power stations will come on-line in the next five years. This further substantiates the conclusion that radiation protection in New England is experiencing a plateau period as well as static, short-term, career opportunities for radiation specialists in nuclear power, private sector as well as public. Only non-ionizing radiation protection could possibly hold new career opportunities; however, standards and regulations would have to be promulgated in order to prime this potential career area. At this time, the possibility of this occurring seems at best remote.

E. Conclusion

The Radiation Program of Region I directly reflects EPA's uncertain regulatory authority and responsibilities in radiation protection. Up to this time, the program nationwide has considered itself as a type of advocacy group within the federal government whose primary mission is to develop radiation standards and then attempt to convince the appropriate agency to promulgate them in a manner consistent with EPA's intent. To date the agency has been moderately successful in this task of regulating by influence; however, some professionals would like to see EPA's role expanded to directly include all environmental aspects of radiation control from the present responsibilities of issuing standards and regulations to inclusion of implementation and enforcement authority. It is believed that this coherent approach would make the federal commitment to radiation control more effective and consistent with the authority and responsibilities that EPA possesses in all other pollution control and abatement areas.

The need for a restructuring of the federal government's role in radiation control to provide a consistent national effort has been a continuous assertion by professionals in the field at both the state and federal levels. However, they continually explain that the likelihood of this occurring within the next few years is slight, unless the Executive Branch and Congress take steps towards initiating such a change. Obviously, if no change occurs in EPA's mandate the radiation program in Region I will continue at a workforce level consistent with its minimal responsibilities, and will not experience any program or workforce growth until sometime after 1982 when the number of on-line nuclear generating units in New England is scheduled to begin a major seven-year increase.

With the advent of this new growth in Region I's nuclear facilities, it has been judged that the regional radiation program will experience a new degree of priority. As has been the case in the past, a program which assumes a higher level of priority generally experiences an increase in its workforce size. However, to speculate on this increase is beyond the five year horizon of this study.

VI. SOLID WASTE

A. Workforce Profile

The Solid Waste Program of EPA Region I currently is responsible for providing technical assistance to its state counterparts on all aspects of solid and hazardous waste disposal. The regional program also provides substantial amounts of funding to the six New England states to support their individual solid waste programs. Generally this funding is used for supporting positions in landfill site control, hazardous waste control, and state solid waste management regulations enforcement. Some funding is also used to aid in the development of statewide plans for reducing waste at its source as well as limited resource recovery activities. This money supports approximately one out of every three positions in Region I's state solid waste programs and has, over the past few years, been on the decline due to lack of legislative initiative on both the state and federal level.

However, the 94th Congress recognized the fact that although the problem of municipal waste is a state and local problem, federal support and regulations were desperately needed to develop consistent urban and rural capabilities to handle this growing problem more effectively. With this realization, the Resource Conservation and Recovery Act (RCRA) of 1976 was enacted to expand the current provisions of the Solid Waste Disposal Act of 1970. This new law sets forth eight primary objectives which will impact Region I's Solid Waste Program as well as the programs of the New England states. The act authorizes EPA to:

(1) provide technical and financial assistance to state and local governments for developing comprehensive solid waste management plans;

(2) provide training grants;

(3) prohibit future open dumping and phase out past practices by 1983;

(4) regulate all aspects of hazardous waste control;

(5) promote a national Research and Development program;

(6) promote the demonstration, construction, and application of solid waste management, resource recovery, and resource conservation systems;

(7) establish a cooperative effort among industry and all levels of government in order to recover valuable materials and energy from solid waste; and,

(8) promulgate guidelines for disposal of all municipal and industrial solid waste in either sanitary landfills or resource recovery plants.

Currently, it is proposed that an increase of 7 million dollars above and beyond the current funding level of 15 million dollars be authorized to support the expanded responsibilities of EPA's solid waste program nationwide. Additionally, it has been proposed that 30 new positions be added to the current EPA solid waste staff to be allocated among the regions and Headquarters. However, these two increases will not result in an increase in EPA's total staffing or funding levels. The new positions and money will be reprogrammed and reallocated from other pollution control and abatement programs within the agency. It remains to be seen whether or not the new administration will accept this previous proposal. If the current limited federal sector growth policy espoused is indicative, then it is likely that some variation of the current proposal will be implemented. Nevertheless, whatever proposal is finally acted upon, current elements of hazardous waste regulation will be the primary focus for expanded activities.

In anticipation of an emerging priority concerning hazardous wastes, the Region I solid waste program has initiated the following preliminary activities to determine environmentally acceptable practices and strategies specific to New England:

(1) Assessments of federal and state hazardous waste programs;

(2) Surveys of industries known to produce hazardous waste byproducts;

(3) Development of guidance materials for initiating state hazardous waste programs;

(4) Development of strategies to solve industrially related hazardous waste problems;

(5) Development and provision of technical assistance concerning storage, handling, processing, and disposal of hazardous materials.

Additionally, it is anticipated that efforts will be increased to address the problems of municipal and industrial sludge disposal. It is hoped that an overall stimulation of activities for this fiscal year as well as ensuing years will serve to reduce most current solid waste associated problems in air and water pollution.

Beginning in fiscal year 1978 this new law will authorize EPA Region I to distribute slightly larger amounts of funding to the New England state solid waste programs to meet the objectives outlined by Congress. As depicted in Table XXVI, states such as Maine and Connecticut whose environmentally acceptable solid waste facilities serve only 1% and 28% of their state populations respectively, need to be extensively upgraded to comply with the new Act.

TABLE XXVI

NEW ENGLAND POPULATION SERVED BY ENVIRONMENTALLY ACCEPTABLE SOLID WASTE DISPOSAL FACILITIES

State	Population	Percentage*
CONNECTICUT	868,588	28%
MAINE	10,400	1%
MASSACHUSETTS	2,976,717	51%
NEW HAMPSHIRE	627,276	78%
RHODE ISLAND	336,245	35%
VERMONT	313,694	67%
TOTAL	5,132,920	42%

*State percentages taken from Regional Administrator's Annual Report - Environmental Quality in New England, U.S. EPA Region I, August, 1976.

As most municipal waste in New England is deposited in area landfills, Table XXVII is included to give a brief idea of the total number of landfills regionwide. Most of these facilities do not qualify as environmentally sound, and it is not certain whether anticipated funding will be enough to allow the states to staff up to a level consistant with compliance to all promulgated regulations. Further, it is anticipated that the new act will have very little effect on local workforce devoted to municipal solid waste disposal.

TABLE XXVII

REGION I LANDFILLS

State	Public	Private	Contract	Total
CONNECTICUT*	132 (89%)	17 (11%)	--	149
MAINE	344 (99%)	4 (1%)	--	348
MASSACHUSETTS	268 (77%)	78 (23%)	--	346
NEW HAMPSHIRE	151 (86.5%)	8 (4.5%)	16 (9%)	175
RHODE ISLAND	22 (67%)	11 (33%)	--	33
VERMONT	26 (52%)	19 (39%)	4 (8%)	49
TOTALS	943 (86%)	137 (12%)	20 (2%)	1100

* These figures were determined from a listing of all solid waste disposal facilities in Connecticut supplied by the Solid Waste Division, Connecticut Department of Environmental Protection. All other figures are from a survey conducted by "Solid Waste Systems", October - November, 1976.

Currently within EPA's regional solid waste program there are four individuals charged with coordinating federal solid waste efforts in Region I. As can be seen in Table XXVIII, this staffing level includes three professional engineers and one clerk/typist. Turnover to date has been zero.

TABLE XXVIII

REGION I SOLID WASTE POLLUTION CONTROL

Current (1976) Staffing Level

Position	1976
Engineer	
Sanitary	2
Environmental	1
Clerical	1
TOTAL	4

B. Workforce Projections

The Resource Conservation and Recovery Act (RCRA) of 1976 (P.L. 94-580) provides for upgrading federal and state solid waste management programs by:

1.) Including sludge, liquids, contained gases, and traditional refuse in the scope of solid waste regulatory authority;
2.) Requiring control over the storage, treatment, and land disposal of hazardous wastes;
3.) Requiring the gradual phasing out of "open dumps";
4.) Promoting the establishment of environmentally sound land disposal and resource recovery systems for all solid waste;

During FY 1978 assistance to the states in New England by the Regional Solid Waste Program will tentatively include:

1.) Assistance in conducting open dump surveys;
2.) Assistance in completion of state solid waste management strategies;
3.) Assistance in the development and implementation of authorized state solid waste management plans with particular emphasis on hazardous waste management as provided for by RCRA.

The following table briefly summarizes the anticipated five-year growth pattern for Region I's solid waste program. The table includes two positions involved in municipal and industrial sludge disposal as well as six positions involved with hazardous waste regulation.

TABLE XXIX

SOLID WASTE POLLUTION CONTROL

Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum growth (average)
Engineer	3	5	6	7	8	8	24%
Attorney	0	0	1	1	1	1	20%
Clerk/Typist	1	1	2	3	3	3	30%
TOTAL	4	6	9	11	12	12	27%

C. Training and Certification

Training for staff members of the Solid Waste Program in Region I comes primarily in the form of informal on-the-job training. There are no EPA sponsored or supported courses offered in Solid Waste Technology or Management currently available to the regional program. As a result of a ban on travel out of the region, access to courses and seminars is limited to those sponsored in the immediate area of Region I. The educational and training offerings beyond entry-level courses with the institutions of the six New England states have been classified as somewhat sparse. In the immediate Boston area, the only comprehensive program offered is at Northeastern University, which offers an advanced degree in Sanitary Engineering.

Additionally, independent training seminars (non-federally sponsored) are currently not recognized by the Regional Training Office and, as a result, any available funds to attend these programs cannot be utilized; thus, day to day program operational expenditures must be tapped to provide for travel, lodging, and registration fees. Unfortunately, to date this method is less than practical since appropriations for attending indepenent seminars are limited.

Future training activities of Region I's solid waste program could be quite extensive due to the comprehensive nature of the Resource Recovery and Conservation Act of 1976. At this writing, however, explicitly defined regional programs have not been approached. It is more than likely that the major thrust of any EPA sponsored training will be directed towards state and local agencies as provided for under PL 94-580. Specifically, Section 7007 of the Act authorizes EPA to make either grants or contracts with state solid waste programs, interstate solid waste agencies, municipalities, and educational institutions, as well as private organizations to develop and implement training programs to train individuals for occupations in solid waste management. Additionally, funds will also be made available to train instructors and supervisory personnel to train or supervise workforce involved in solid waste disposal and resource recovery.

It is expected that training goals and activities for regional solid waste personnel presumably will be upgraded as a result of RCRA. However, certain training restrictions imposed upon the program by the Regional Office will have to be reconciled in conjunction with an expanded financial base for the program.

1.) EPA's regional training office must recognize independently sponsored solid waste training seminars and provide for all appropriate expenses incurred.

2.) Out of region travel must be authorized for training purposes due to the lack of available programs in the region.

3.) Training initiatives in solid waste must be reinstituted to the level of four years ago when training for EPA employees in New England was encouraged.

D. Career Potential

Generally it is assumed that new careers in the regional solid waste program will be of a professional planning nature, necessitating a certain degree of proficiency in solid waste management as well as technology. As noted in the workforce profile, careers in hazardous waste planning and management will be particularly emphasized under RCRA in Region I.

However, the major thrust of expected career potential will come at the state, local, and private levels as resource recovery and conservation related careers begin to flourish.

The following list provides a broad summary of those areas expected to assume an increase in workforce over the next five to ten years. Due to the potential economic benefits to be derived from utilization of resource recovery techniques, the greatest career potential will occur in the private sector.

- Recovered materials markets
- Resource recovery technology R&D
- Architect and engineering, consulting firms
- Equipment makers
- Solid waste management consultants

Hazardous waste management is another activity recently emphasized by PL 94-580 which will impact the solid waste workforce. Due to the regulatory nature of this federal requirement (as opposed to economic incentives provided for by Resource Recovery) most new positions will develop in the public sector. Careers in the private sector will develop according to regulations and requirements promulgated by federal, state, and local authorities. Research and development in hazardous waste disposal and treatment, traditionally a private sector activity, will increase substantially as new requirements demanding best available technologies are established by state and federal governments. Detoxification specialists will be required to neutralize a wide variety of hazardous wastes as well as combinations thereof. Additionally, careers at the technician level will develop for labor intensive activities such as collection, storage, tranportation, treatment, and disposal of hazardous wastes. It has been suggested that these activities could produce a workforce similar in nature to that currently involved in radioactive materials collection, storage, transportation, treatment, and disposal. Finally, at the state and federal level, a cadre of inspectors and enforcement officers will be needed to ensure the integrity of compliance with promulgated regulations.

In conclusion, as solid waste management practices develop toward environmentally and economically sound and productive levels, the workforce involved will grow considerably in the private sector as the act tends to impact this sector of the economy. More importantly, however, the composition of the workforce will change dramatically from a basically low-skilled level to one of a highly technical nature. Employment impacts on the local public sector will be dependent upon the attitude local governments take towards resource recovery. Up to now, public institutions in New England have liberally contracted facilities and their subsequent operation to private industry with only a minimum of involvement, mostly in the form of areawide planning and management.

E. Conclusion

The inevitable growth of resource recovery plants and practices as a result of a decrease in non-renewable resources and the increased economic benefits of recycling due to inflated energy costs has created a new approach to the concept of solid waste management. New regulatory legislation enacted by Congress in 1976 has acknowledged a change in attitude towards traditional concepts of solid waste and has provided a commitment towards practical resource recovery and conservation. It is conceivable that as recycling of wastes becomes more and more critical a construction grant program to federally finance municipal resource recovery facilities could become a reality.

New England has taken a decisive lead in approaching these realities through extensive initiations of areawide solid waste management planning prior to any federal requirements for such activities. EPA Region I has specifically approached the inevitability of hazardous waste management regulations by conducting preliminary surveys of industry and current practices in New England.

The growth function of EPA Region I's solid waste program is dependent on the degree and extent of regulations, standards, and requirements placed upon it by the headquarters program in Washington. All estimates contained in this report reflect anticipated real workforce growth based on past experience. This is not to say, however, that the program will not grow beyond what is projected. This program probably has the largest growth potential of all programs in the region as the Resource Conservation and Recovery Act of 1976 has a large number of goals to be accomplished in what has been described as an extremely well integrated timeline and approach. Solid waste management plans, training grants, open dumps, sanitary landfills, hazardous wastes, and resource recovery are all areas of concern to be addressed by Region I's solid waste branch over the ensuing years, and the workforce associated with each activity will have to be of a dimension to ensure the intent of Congress. As solid waste management practices are upgraded, the intermediate aspects of disposal will be significantly lessened, thereby alleviating those sources on air and water pollution resulting from improper solid waste disposal techniques.

VII. WASTEWATER

A. Workforce Profile

Most of the pollution in waters of the United States is generated by one of two sources, industry or municipalities. To control this pollution, Congress enacted the Federal Water Pollution Control Act (FWPCA) in 1956. The basic premise of the law was the establishment of a construction grant program to finance local waste water treatment facility projects nationwide. This law was amended in 1966 and again in 1972 and constitutes the basis of the present federal program in water pollution control. Funding offered under this program currently provides 75 percent of the total cost of constructing municipal waste water treatment plants, interceptor sewers, and pumping stations. The remaining 25 percent is financed by state and local governments usually in the form of a 15 percent state match and a 10 percent local contribution.

The Federal Water Pollution Control Act Amendments have as their goal the attainment of a level of water quality in the United States by 1983 that will protect aquatic life and be clean enough for swimming and other recreational uses. The amendments propose to achieve this goal through a two-phase approach. The first phase, to be completed by July 1, 1977, requires that industry use the best practicable technology to control pollution, and that public treatment plants provide at least secondary treatment. By the completion of the second phase on July 1, 1983, industry must use the best available technology, and public facilities must provide the best practicable technology for water pollution control.

FWPCA is administered by EPA and the states through two programs provided by the act: a construction grant program and a discharge permit program. The construction grant program, as previously mentioned, provides funds for the construction of municipal waste water treatment facilities. Prior to awarding a community funding to initiate such a facility, the application must be reviewed for both design and specifications. In addition, an environmental impact statement must be submitted and reviewed in the Regional Office before the grant is given. After the award is made, the Regional Office monitors and inspects the construction. Currently this inspection activity in Region I is conducted by the General Services Administration and EPA under an inter-agency agreement establishing a joint inspection program through September 30, 1977. With over three hundred water pollution projects underway, this agreement has considerably lessened EPA's workload and has established a sound quality control program.

At the time of this study, Region I had obligated only 60 percent of available funding under FWPCA one year before the scheduled deadline of September 30, 1977. It has been estimated that the monies obligated so far have created some 20,000 engineering and construction jobs,as well as numerous jobs involved in the operation and maintenance (O & M) of these new facilities. With a substantial amount of funding to be obligated within the next year, professionals have judged that an additional 10-15 thousand engineering and construction jobs will be created. Of course, many of these jobs do not necessarily reflect a comparable level of workforce as many individuals may be involved in more than one project.

The other major program under FWPCA is the National Pollutant Discharge Elimination System (NPDES), a permit program to regulate the amount of pollutants discharged into the waters. EPA has the responsibility to set standards for the effluent limitations or the maximum amount of pollutants that can be discharged into a body of water. While sources of this pollution such as municipal waste treatment plants and industrial plants must monitor and report on the waste discharged, EPA has the authority for the issuance and enforcement of the permits. These activities are generally carried out by the Regional Office.

Since the operation and maintenance of wastewater treatment facilities are local responsibilities, EPA has encouraged the states to become involved in both the review of construction grants and the administration of the NPDES program. In Region I these responsibilities have already been delegated to Connecticut and Vermont. Maine has partially assumed some of the construction grant functions but has not been delegated the NPDES program. Massachusetts, New Hampshire and Rhode Island have not as yet assumed any primary responsibilities under either the construction grants program or the NPDES permit program. The Regional Office continues to have substantial responsibility over these programs and must administer them where they have not been delegated to the states.

EPA's wastewater program also has the responsibility for partial administration of the Marine Protection, Research and Sanctuaries

Act of 1972. This Act, which establishes a permit program for ocean dumping and bans the dumping of radiological, chemical and biological warfare agents in the oceans, is also administered by the Commerce Department, Army Corps of Engineers, and the Coast Guard. The law is particularly significant to Region I water quality program since all states except Vermont within the region border the ocean. Additionally, EPA has responsibility for initiating and administering comprehensive areawide waste management planning, basin planning, and water quality monitoring. To date these activities have been assumed by all six states in Region I.

The areawide waste treatment program is mandated by Section 208 of the Federal Water Pollution Control Act and stresses planning by local governments to find and implement solutions to their water quality management problems. In Region I, 19 area agencies have been designated to develop 208 plans for water pollution control and during 1977 high priority will be placed on providing these agencies with extensive technical assistance to fulfill their planning requirements.

Specifically, the information included within an areawide waste treatment management plan identifies the following six major areas of concern in long range water quality planning:

1.) Determination of the number of wastewater treatment facilities needed to maintain acceptable water quality over the next 20 years.
2.) Identification of the management and functional structure for implementation over this period.
3.) Identification and development of a long range methodology for dealing with non-point source pollution.
4.) Determination of required long term financial arrangements of the implementing organization(s); time requirements, anticipated costs, and an environmental and economic impact statement on the area designated under the plan.
5.) Definition of those methods to be utilized in disposal of sludge and treated water from those plants within its jurisdiction.

The relationship between the 208 program, the construction grant program, and the NPDES program is unique. Both NPDES and construction grants deal with easily identifiable point source water pollution which can be corrected given enough money and technology. In New England these point source problems are coming under control as the result of these two programs; however, non-point source water pollution, such as urban and agricultural runoff, cannot be dealt with to any extent through these aforementioned programs. 208 in New England provides the mechanism whereby these non-point sources are identified and alleviated by intensive areawide assessments and planning. Through this three-tiered approach, federal water quality standards can be attained.

Currently within EPA Region I's Water Quality Planning Branch there are approximately ten and one-half person-years devoted to Section 208 activities. The role of these individuals charged with Section 208 federal activities is in the form of monitoring all planning activities including review of the technical work performed, and providing financial assistance to the designated agencies. However, the primary emphasis of the program is to allow local communities, through their own political structures, to determine their own approach for attaining water quality standards.

FY 1977 Water Quality Program priorities for EPA Region I are divided into three broad categories. The highest water quality program priorities for implementation during FY 1977 include:

1.) Municipal construction program management;
2.) Permits, compliance monitoring and enforcement under NPDES;

3.) State and regional planning and standards;
4.) Water quality monitoring (as it relates to the aforementioned priorities).

The second set of water quality program priorities currently being addressed by the Water Programs Division include the following activities:

1.) Municipal operations;
2.) Oil and hazardous spills response contingency planning programs;
3.) Non-NPDES water quality enforcement;
4.) Federal interagency coordination in 208 areawide planning;
5.) Ocean site environmental impact statements and ocean dumping permits;
6.) Dredged or fill materials discharge permits;
7.) Small Business Administration loan review;
8.) Water quality monitoring (as it relates to the aforementioned priorities).

Finally, the third set of water quality program priorities for New England center around the following:

1.) Minor discharger permits, compliance monitoring and enforcement;
2.) Oil and hazardous spill prevention and control programs;
3.) Technical studies and support programs which call for state and/or regional participation;
4.) The Clean Lakes Program;
5.) Advertisement of the Small Business Administration's loan programs.

These FY 1977 priorities present EPA Region I's current strategies for implementing the Federal Water Pollution Control Act in New England. Program operations decentralization to the states is a basic priority which pervades each of the three categories which make up this year's implementation goals.

Anticipated program priorities for FY 1978 in Region I will, like FY 1977, include a three-tiered set of implementation strategies which present the agencies directives to fulfill PL 92-500. The highest priority water quality programs for EPA include the following:

1.) State and regional water quality management with emphasis on 208 areawide planning;
2.) Management of the construction grant program;
3.) Major NPDES permits issuance;

4.) Implementation of the Basic Water Monitoring Program;
5.) Compliance monitoring and enforcement relating to major discharges under NPDES;
6.) Monitoring support to the newly defined Toxic Substances Control strategy.

The second priority grouping for the federal water quality programs in New England is composed of the following activities:

1.) Delegations to the states;
2.) Municipal operations and workforce planning and training;
3.) Disaster assistance, oil and hazardous spill response and contingency planning;
4.) Oil and hazardous spill prevention and control programs;
5.) Non-NPDES water enforcement;
6.) Effluent guidelines and pretreatment support;
7.) Federal interagency support for Section 208 areawide planning;
8.) Ocean site environmental impact statements and ocean dumping permits;
9.) Dredged or fill materials discharge permits;
10.) Small Business Administration loan review;
11.) Water monitoring as related to the aforementioned programs.

Finally, the third level of regional priorities for implementation of water quality programs will include the following group of activities:

1.) Issuance of discharge permits other than industrial or municipal;
2.) Technical studies and support programs which demand state and/or regional participation;
3.) The Clean Lakes Program;
4.) Advertisement of the Small Business Administration loan program.

A comparative analysis between FY 1977 priorities and FY 1978 anticipated priorities shows little change in the philosophy of approach. Construction grants, NPDES permits, and 208 will continue to head the list of major activities; however, with construction grants nearing completion and NPDES permits operational, FY 1977 should show an increased emphasis in New England on 208 planning, especially on statewide non-designated planning (those areas not covered by a local/regional 208 planning agency). A recent court decision released 137 million dollars in 208 planning funds and requires states receiving these monies to implement areawide waste management planning in non-designated areas without delay. In New England, it is expected that a doubling of 208 grants to the states will occur as a result of this action. Specifically the changes in the three priority levels established by the Water Quality Program of EPA are as follows:

1.) As a result of PL 94-649 (the Toxic Substances Control Act) the first level of priority shows an additional task of monitoring support for the toxic substances program in EPA;
2.) With effluent guidelines for new and existing point sources approaching finalization, Region I's second order of priorities shows that an upgrading of regional water monitoring and sampling of industry will be instituted to provide the Office of Water Quality Planning and Standards in EPA, Washington, with an adequate data base to support promulgation of its Best Available Technology (BAT) effluent standards and guidelines;
3.) As final strategies concerning industrial wastes discharged into municipal sewer systems develop, Region I will be involved in coordinating and developing programs addressing industrial pretreatment primarily through existing 208 areawide planning agencies. This activity has been classified as at the second priority level;
4.) The development of water pollution control related training capabilities at the state level to insure proper O&M of facilities upgraded or built under the construction grant program will become a task during FY 1978 in the second priority classification scheme; and
5.) Finally, Region I's Oil and Hazardous Spill Prevention and Control Program has been upgraded from a third priority level to a second for FY 1978. An increased effort is scheduled to insure that major dischargers (non-transportation related facilties) minimize the frequency of spills and possess access to environmentally sound removal and disposal methods, capabilities, and contingency plans to deal effectively with problems of this nature.

Within the Regional Office of EPA responsibilities of wastewater abatement and control come under the auspices of the Municipal Facilities Branch and the Water Quality Branch, both located in the Water Programs Division. The Municipal Facilities Branch assists state water pollution control agencies and select municipalities by administering the Construction Grant Program. The Branch also conducts O & M inspections and offers technical assistance to completed minicipal wastewater treatment facilities. The Water Quality Branch is responsible for coordinating section 208 areawide waste water management planning grants and reviews construction grant applications for compliance with basin and areawide water pollution control plans. The Branch also reviews industrial, municipal and ocean dumping permit applications for compliance with existing water quality standards.

To administer the wastewater program within the agency, Region I employs approximately 78 individuals in the Water Programs Division working in the areas of construction grants, water quality planning, and administration. As can be seen in Table XXX, the bulk of individuals employed are engineers with backgrounds primarily in sanitary, environmental, and civil engineering. Scientists employed generally have backgrounds in aquatic biology and chemistry. Technician backgrounds range from engineering to environmental health. Administrators generally have a full range of expertise ranging from scientific and engineering degrees through program planning and analysis backgrounds. Additionally, federal grant assistance to the six New England states will be continued by EPA's solid waste program and a new technical assistance delivery system, through "Resource Recovery and Conservation Panels" as mandated by PL 94-580, will provide state and local governments with consultation on solid waste management, resource recovery, and resource conservation practices.

TABLE XXX

WASTEWATER POLLUTION ABATEMENT AND CONTROL

Current (1976) Staffing Level*

Position	1976
Engineer	
Sanitary	46
Civil	1
Environmental	2
Environmental Protection Specialist	5
Program Analyst	1
Environmental Studies Coordinator	1
Grants Specialist	1
Grants Assistant	3
Grants Clerk	3
Engineering Technician	3
Clerk/Typist	12
TOTAL	78

* Includes employees in the immediate office of the Water Programs Division

Workforce projections for the Region I Solid Waste Program can be viewed from a number of different perspectives. Prior to RCRA, growth based on past experience was determined to involve the addition of two new professional sanitary engineering positions over the next five years. It was anticipated that these individuals would serve as technical specialists assisting both in-house EPA activities as well as state activities, primarily in the area of municipal and industrial sludge disposal.

However, the Resource Conservation and Recovery Act of 1976 was enacted and, as described in the previous Workforce Profile, its objectives have considerably expanded the authority and activities of the EPA regional solid waste programs. Specifically, the solid waste program of EPA Region I anticipates an additional six positions over the next five years to address the area of hazardous waste control. Two administrative/clerical positions will be needed to process federal report forms involved in regulating state hazardous waste activities. Additionally, three chemical engineers will be needed to support the technical and planning aspects of a federal hazardous waste program. Finally, it is anticipated that one attorney will be included over the next five years to provide on-site assistance in regulatory interpretation as well as litigation.

There are approximately 27 other professionals involved in water pollution abatement and control in the Regional Office. They are situated within the various other divisions which have been delegated responsibilities in implementing FWPCA. Generally, their positions are supportive and complement the overall mission of the Water Programs Division as "lead division". Activities by these individuals involve planning and standards, strategies implementation, monitoring and analysis, and municipal source control. Additionally, the Enforcement Division has both an Enforcement Branch and a Permits Branch which have activities in the coordination of NPDES as well as other water pollution enforcement activities. This division employs approximately 55 people; however, only part of their time is directed toward water related activities since the Division is also the primary enforcement arm for other pollution control programs in the Regional Office. It should be noted, however, that when compared with other region programs, the enforcement division spends a proportionately larger percentage of its time on water quality related activities.

B. Workforce Projections

According to estimates provided by program professionals, the number of personnel in the wastewater program in Region I is expected to increase at a rate of about 4 percent per year over the next five years. The increase will occur in all occupational categories with the largest occurring in skilled professional and program administration positions. A need for engineers, scientists, and planners will continue as their expertise runs concurrent with the functions of FWPCA. There will be a comparable increase in the number of administrative and supportive positions. Overall, the types of jobs opening should be relatively portionate to the composition of professionals and non-professionals currently employed in the program. Most of the educational and training requirements will remain the same although it has been suggested by professionals in the region that increased emphasis should be placed on management training.

It should be noted here that the previous projections represent a compromise between the hard needs and optimum needs budget indicated in the 1976 Regional Preview Study. Actual growth should be found somewhere in this area, as it is becoming increasingly evident that the proposed hard needs budget is quickly becoming outdated as increased responsibilities and deadlines loom on the horizon. Although the optimum budget (5% per annum growth) would be an ideal target level of staffing, realistic and practical judgements by professionals indicate a growth rate of about 4%. Specifically speaking in the area of water quality planning, additional positions will be divided between section 208 activities and New England's Clean Lakes Program (which currently has an official staffing level of 0). The primary workforce increase in wastewater will come in the area of construction grants with a large initial increase followed by a slight tapering off through 1981. Justification of this perceived rate of growth is supported in Table XXXI which attempts to enumerate basic needs critical to the program.

Other priorities at the national and regional level necessitate the need for increased personnel. First of all, implementation of FWPCA is moving from Phase I into Phase II. While Phase I emphasized the issuance of permits and award of construction grants, Phase II will concentrate on other areas such as nonpoint source pollution and toxic pollutants. The control of nonpoint sources such as runoff and acid mine drainage requires a development of control strategies by the states and 208 areawide planning agencies with direction from the Regional EPA Office. A toxic substance control strategy must be developed to meet the 1983 goal. Phase I has been concerned with the control of traditional pollutants but the recently passed Toxic Substances Control Act will require more effort towards eliminating toxic wastes.

In the NPDES program, permits can be granted for a duration of no more than five years. These permits have been issued to comply with 1977 requirements and when the initial permits expire, new ones issued will require compliance with the 1983 standards. During Phase II, compliance monitoring and enforcement will be the major efforts in this program, and will be a high priority activity within the region.

TABLE XXXI

BASIC NEEDS TO BE SATISFIED BY WORKFORCE GROWTH IN REGION I'S WATER POLLUTION ABATEMENT AND CONTROL PROGRAM

Construction Grants Needs

(1) Additional staff to provide technical assistance and preparation to support further state delegation of FWPCA authorities.

(2) Additional staff for state assignments to support state delegation of authority.

(3) Additional staff to conduct frequent interim inspections of waste water treatment projects in progress including permanent on-site presence on larger projects.

(4) Additional staff to provide technical assistance and O & M inspections after completion of construction.

(5) Additional staff to provide relief for currently overburdened management support activities associated with the construction grant process.

Water Quality Planning Needs

(1) Additional staff for the New England Clean Lakes Preservation and Restoration Program.

(2) Additional staff to upgrade present activities on areawide waste management planning (section 208 planning) in anticipation of a doubling in funding available for this activity.

(3) Additional staff for water quality standards revision and non-point source activities as well as basin and facility planning.

Other areas which will receive increased emphasis within the region are ocean dumping alternatives and the control of oil and hazardous material spills. The phasing out of ocean dumping will require that alternative disposal sites will be available inland. This, along with the review of plans for the prevention of accidental oil and hazardous material spills, will require increased workforce at the regional level.

Another factor which will affect the workforce in the Regional Office is the recent court decision to release 137 million dollars in 208 planning funds and to require states to do 208 planning in areas not already designated as 208 agencies. This, combined with the anticipation that EPA will be given over a billion dollars in sewage construction funds and several million dollars for new employees in supplemental funding for the program in FY 1977, will increase the workforce resources of the Regional Office. These activities are also expected to create a substantial number of additional positions in the states and municipalities.

The following table forecasts the occupational growth likely to occur in Region I water quality abatement and control efforts over the next five years. Overall, a four percent workforce growth rate has been incorporated into these projections. Most growth as shown will occur during 1978 in the area of construction grants with tapering off thereafter. Water quality planning will experience most of its workforce increase during 1978 and 1979 with a leveling off occurring through 1981. The Clean Lakes Program, water quality monitoring and analysis, and the 208 program will be responsible for most of the growth in this area.

TABLE XXXII

WATER POLLUTION ABATEMENT AND CONTROL

Workforce Projections to 1982 (est.)

Position	1976	1977	1978	1979	1980	1981	%/annum growth (average)
Engineer	49	51	58	59	59	59	4%
Scientist	3	3	4	4	4	4	7%
Administrative	8	9	9	10	10	10	6%
Technician	3	3	4	4	4	4	7%
Clerical	15	15	16	17	17	17	3%
TOTAL	78	81	91	94	94	94	4%

C. Training and Certification

Training and certification activities offered to EPA water employees currently cannot be classified as meeting the continuing needs required by professionals charged with implementing the various programs required by the Federal Water Pollution Control Act in New England. The primary cause for this situation emanates from restricted funding levels which have placed the regional program in a position where it is barely able to satisy its immediate program needs. In most instances, training is veiwed as a long term investment and necessitates capital expenditures not considered cost effective in an immediate short term sense. Thus, with what has been classified as a limited inflow of monies to support programmatic responsibilities, it seems only logical that under this philosophy and commitment relatively little money can or will be devoted toward formal upgrade training.

As in most working situations, new employees undergo an informal on-the-job training period where they are assigned to work in conjunction with another more experienced employee who has a working knowledge of the area the new employee will be assigned to. This is a practice common not only to wastewater, by to all abatement and control programs within EPA Region I. Generally, the aforementioned informal learning situation applies to professional or technical personnel who must be able to apply a specific expertise unique to immediate program responsibilities. Training for support type individuals, such as clerks and typists who do not need a large degree of specificity in regard to program content, is scheduled by the U.S. Civil Service Commission in Region I on a tuition basis. This training is constantly in demand throughout the federal regional offices in Boston; thus, the magnitude of demand can justify formal training at an attractively reduced cost.

Courses offered through EPA's Offfice of Water Programs Operation at the National Training Center in Cincinnati, Ohio, are attended by Region I water personnel; however, these offerings generally address specific laboratory analysis techniques and methodologies rather than more sought after administrative and planning techniques. As such, state, local and private water quality field, laboratory, and plant personnel are generally considered the incidence population for this training; thus, participation by EPA Region I personnel is quite limited.

A concern which has been continually repeated, not only in the water programs but also in the other EPA pollution control and abatement programs, involves the lack of formal program-specific management training. As the primary role of a regulatory program is administration, it follows that management courses tailored to FWPCA should be available to ensure effective program management. This would, in turn, enable the most efficient delivery of services to the states. However, at the present time this approach to applied program-specific administration techniques through formalized training does not exist, and is not planned for the foreseeable future.

Although the agency is planning a major emphasis on developing operator training programs for local wastewater treatment personnel, future training plans for EPA water personnel appears to be quite limited. Planned at this time for regional presentation during FY 1978 are two hazardous substances episode response sessions. The passage of the Toxic Substances Control Act provided the impetus for scheduling these regional workshops.

A survey of wastewater training programs in New England, conducted by the Water Programs Manpower Office of Region I, is included in this section to provide an overview of various levels of formal training being offered in the region. Table XXXIII lists this information by state, type of program, sponsoring agency, duration, and degree awarded. As can be seen, EPA funds a six-week program in each state addressing process control techniques for wastewater treatment plant operation. Additionally, the agency provides support for two training programs in laboratory testing techniques for Massachusetts and New Hampshire. EPA funding in most instances, has resulted in the only state sponsored training packages available except for Vermont's Agency of Environmental Conservation which independently developed and funded eleven short-courses in wastewater treatment plant operation to be presented regionally in the state.

TABLE XXXIII

SELECT WASTEWATER TRAINING PROGRAMS IN NEW ENGLAND

Type of Educational Program	Sponsoring Agency	Duration and/or degree
	CONNECTICUT	
Water Ecology (emphasis on water, wastewater, treatment systems, and drinking water)	Farmington High School	One course/day
Environmental Engineering (emphasis on water, air, soil, noise, and solid waste)	University of Hartford	Certificate after Bachelor of Science
Environmental Science and Technology (emphasis on wastewater, water, air, environmental management, and solid waste)	Hartford Graduate Center	Master of Science
Wastewater Treatment Plant Oper. Training Course in Process Control Techniques	Connecticut Department of Environmental Protection, Hartford	6 weeks/EPA funded
Environmental Science (emphasis on air, hydrology, water, safety engineering)	Middlesex Community College, Middletown	Associate in Science in Environmental Science
Environmental Quality (emphasis on air, water pollution)	Yale University, New Haven	Bachelor in Engineering and Applied Science
Ecology (emphasis on local analysis of water bodies, lab analysis, and problems with wastewater treatment and solid wastes)	Seymour Senior High School	One-half year course, day
Environmental Engineering (emphasis on land, air, water)	University of Connecticut Graduate School at Storrs	Ph.D.
Civil Engineering (emphasis on soil, water, wastewater, and solid wastes)	University of Connecticut Graduate School at Storrs	Master of Science and Bachelor of Science in Civil Engineering
Environmental Studies (includes water and air quality control)	University of New Haven, West Haven	Bachelor of Science in E.S./day or evening
Master of Science in Environmental Studies (emphasis on water treatment, wastewater treatment, air air pollution)	University of New Haven, West Haven	Master of Science in Environmental Studies

TABLE XXXIII (Continued)

Type of Educational Program	Sponsoring Agency	Duration and/or degree
	CONNECTICUT continued	
Environmental Health Technology (solid waste, water pollution control, air pollution)	Northwestern Connecticut Community College, Winsted	Associate in Science
	MAINE	
Wastewater Treatment Plant Operator Training in Process Control Techniques	Maine Department of Environmental Protection, Augusta	6 weeks
Environmental Control Technology (includes wastewater treatment, industrial waste treatment, and sanitary chemistry)	Eastern Maine Vocational Technical School, Bangor	Associate in Applied Science
Environmental Problems (water, air, wastewater, energy)	Cony High School	Fifteen weeks/evenings, adults
Wastewater Treatment Technology	Southern Maine Vocational Technical Institute New England Regional Waste Water Institute, South Portland	9 month special wastewater operator short courses/mobile unit
Environmental Studies (consists of pollution control, lakes, streams)	Nasson College, Springvale	Bachelor of Science; also in summers
Environmental Sciences (environmental pollution, environmental chemistry, water pollution)	Unity College, Unity	Bachelor of Science in Environmental Science
Development and Implementation of Competency Based Modular Training	Maine Wastewater Control Association, Winthrop	Held at Maine Vovational Tech. Schools in Auburn, Bangor, Waterville, Presque Isle, South Portland, Calais
	MASSACHUSETTS	
Civil Engineering (Environmental) with emphasis on air, ocean, wastewater, water, solid waste	University of Massachusetts, Amherst	Bachelor of Science/day
Civil Engineering Technology (emphasis on wastewater systems, water supply, and field work)	Wentworth Institute, Boston	Associate in Engineering
Environmental Science (lab field work, water, air, noise, pollution and soil chemistry)	Brookline High School	One course/day

TABLE XXXIII (Continued)

Type of Educational Program	Sponsoring Agency	Duration and/or degree
MASSACHUSETTS continued		
Marine Pollution Abatement (sewage, garbage, air, oil, and hazardous materials)	Massachusetts Maritime Academy, Buzzards Bay	Bachelor of Science/day
Civil Engineering (emphasis on water resources, water quality, hydrology, and environmental management)	Massachusetts Institute of Technology (MIT), Cambridge	Master of Science, Bachelor of Science, Ph.D. in Civil Engineering
Environmental Engineering (train students in water, air, and natural resources)	MIT, Cambridge	Environmental Engineering degree, graduate program
Environmental Science (career goals toward sanitary eng., pollution research and control)	Fairhaven High School	One course/day
Environmental Science (emphasis on water pollution, land use, and energy)	Greenfield High School	One course/day
Environmental Science (emphasis on sanitary engineering, chemistry of air, water, ecological methods, and land-use planning)	Greenfield Community College, Greenfield	Associate in Science/day
Environmental Technology Program (train students for employment in water, wastewater, and wetlands management)	Essex Agricultural and Technical Institute	Associate in Applied Science
Environmental Technology Program (train students for employment in water, air, wastewater, solid waste, and noise abatement)	Northern Essex Community College in Haverhill	July - December
Master of Science in Environmental Studies (emphasis in laboratory, water, wastewater, air, solid waste)	University of Lowell, Lowell	Later afternoon, evening, Master of Science
Mass. Division of Water Pollution Control, Basic and Advanced Wastewater Treatment Plant Operator Training	University of Lowell	Evening
Mass. Division of Water Pollution Control, innovative Lab techniques in wastewater treatment, using the TOC analyzer for advanced wastewater treatment plant operators	University of Lowell	Funded by EPA

TABLE XXXIII (Continued)

Type of Educational Program	Sponsoring Agency	Duration and/or degree
MASSACHUSETTS continued		
Civil Engineering (emphasis on wastewater, water, plant design)	Tufts University, Medford	Bachelor of Science, Master of Science in CE
Environmental Science (lab samples, water, air pollution, soil analysis, and field work)	Peabody Veterans Memorial High School, Peabody	One course/day
Environmental Science (emphasis on air, water, pesticides, lab technology)	Berkshire Community College, Pittsfield	Associate in Science
CETA Wastewater Treatment Plant Operator Training Program	Springfield Technical Community College, Springfield	40 weeks full/included is 6 weeks on-the-job training
Environmental Technology (with options in water, wastewater, air, and solid waste)	Springfield Technical Community College, Springfield	Associate in Environmental Technology
Occupational Safety and Health Short Courses Maintenance Course for Wastewater Treatment Plant Personnel	Springfield Technical Community College, Springfield	8 - 12 hour courses 16 3-hour sessions
Environmental Engineering and Science (emphasis on wastewater, sanitary engineering, lab, water, and plant design)	Worcester Poly Tech., Worcester	Bachelor of Science
Civil Engineering (environmental control) with emphasis on wastewater, sanitary engineering, lab, water, and plant design	Worcester Poly Tech., Worcester	Bachelor of Science, Master of Science, day or evening
Environmental Science (emphasis on land, air, water)	Worcester Poly Tech., Worcester	Bachelor of Science
Environmental Affairs (emphasis on wastewater, water resources)	Clark University, Worcester	Master of Arts, Bachelor of Arts
Civil Engineering (emphasis on water, wastewater, soil)	Worcester Junior College, Worcester	Associate in Science in CE
NEW HAMPSHIRE		
Wastewater Treatment Plant Operator Training in Process Control Techniques	N.H. Water Supply and Pollution Control Commission, Concord	6 weeks, EPA funded
Water and Wastewater Treatment Plant Operator Training in Laboratory Testing and Techniques	N.H. Water Supply and Pollution Control Commission, Concord	10 weeks, EPA funded

TABLE XXXIII (Continued)

Type of Educational Program	Sponsoring Agency	Duration and/or degree
NEW HAMPSHIRE continued		
Civil Engineering (emphasis on water, wastewater, and soil)	University of N.H., Durham	Bachelor of Science in CE
Environmental Engineering Option (emphasis on water, air, and land resources)	University of N.H., Durham	Bachelor of Science
RHODE ISLAND		
Urban and Environmental Planning (emphasis on environmental engineering problems in pollution, water supply, and sewage)	Roger Williams College, Bristol	Bachelor of Science/ day or evening
Civil Engineering (environmental) emphasis on water, solid waste, air, sewage, sanitary chemistry)	University of Rhode Island Kingston	Bachelor of Science, Master of Science, Ph.D. in CivilEngineering
R.I. Dept. of Health "Wastewater Treatment Plant Operator Training Course in Process Control Techniques"	Lincoln Davies Vocational Technical School, Lincoln	6 weeks/EPA funded
VERMONT		
Environmental Studies (train students in water pollution control, environmental engineering)	Southern Vermont College, Bennington	Associate in Science in ES
Civil Engineering (environmental engineering) emphasis on water, wastewater, air pollution, and solid wastes	University of Vermont, Burlington	Bachelor of Science, Master of Science in CE
Environmental Studies (emphasis on water, environmental science, lab, environmental management)	Johnson State College, Johnson	Bachelor in Science in ES
Wastewater Treatment Plant Operator Training in Process Control Techniques	Vermont Agency of Environmental Conservation, Montpelier	6 weeks/EPA funded
Regionalized Training of Sewage Treatment Plant Operators thru mini courses, modules	Vermont Agency of Environmental Conservation Montpelier	11 short courses, 4 hours each
Civil Engineering (emphasis on water, wastewater, and soil)	Vermont Technical College, Randolph Center	Associate in Applied Science in Engineering

TABLE XXXIII (Continued)

Type of Educational Program	Sponsoring Agency	Duration and/or degree
CORRESPONDENCE COURSES		
Operation of Wastewater Treatment Plants	Dr. Kenneth Kerri Dept. of Civil Engineering California State University 6000 Jay Street Sacramento, CA 95819	Estimated 100-150 hours Certificate
Operation and Maintenance of Wastewater Collection Systems	Dr. Kenneth Kerri (same address as above)	Estimated 100-150 hours Certificate
Correspondence Course Manual for Wastewater Plant Operators	Clemson Correspondence 401 Rhodes Center Clemson University Clemson, S.C. 29631	Covers South Carolina Certification levels A-D
Supervisory Management in the Water/Wastewater Field	Self-Study Course Coordinator c/o Clark E. DeHaven Director of Executive Prog. 432 Eppley Center Michigan State University East Lansing, Mich. 48824	Certificate

The need for adequately trained wastewater treatment plant operators is paramount to ensure proper operation and maintenance. Presently, every major plant in New England is inspected at least once a year and, where necessary, plant operations are corrected and the operators are instructed by an EPA operation and maintenance engineer as well as one state engineer in the proper procedures for plant operation. Assistance of this type has occurred at over seven plants in the region and has resulted in the development and implementation of formal O & M technical assistance programs by Connecticut, Maine, and Massachusetts.

Recognizing the fact that plant performance is a crucial factor in attaining compliance levels and that technical assistance and operator training certification can ensure high performance levels, EPA has proposed an extensive Municipal Operations and Workforce Planning and Training Strategy for FY 1978. As the strategy suggests, the focal point of this apprach will be directed towards developing water pollution control related training capabilities at the state level. These capabilities will include:

1.) the identification of staffing and training needs;
2.) the development, demonstration, and distribution of training courses and/or workshops.

The FY 1978 regional workforce planning and training activities in New England will include the following:

1.) Participation in an effort to systemize the construction grants and municipal operations staffing and training needs assessment and development of responsive training programs;
2.) Development of regional and state manpower planning capabilities for construction grants and municipal operations.

Regarding municipal operations, Region I anticipates that the following strategy to determine and rectify O&M capabilities will be in effect for FY 1978:

1.) Identification of municipal wastewater treatment plant O&M problems;
2.) Assessment of the availability and frequency of use of private sector technical assistance in proper operation and training;
3.) Identification of operator training needs, training program development problems, and availability of training resources;
4.) Coordination with states in operator training course delivery.

Finally, to provide a regional overview of current (1975) state wastewater certification examination practices and operator training, the following tables show a state-by-state breakdown of state operator training seminars, including the type of examinations given and the manner in which they are administered. As can be seen quite clearly, there exists a wide variation in practices from state to state. It has been suggested that in order to ensure effective O&M practices as well

TABLE XXXIV

NEW ENGLAND STATE WASTEWATER OPERATOR TRAINING SUMMARIES

PART A

State	Respondent	Preparatory Courses									Continuing Education										Financial Support
		No. of Institutions	No. Students/Year	Course is specific for Operator		Course is for gen. environmental tech.		Can material be used in Conti. Educ.		Basic		Ad-vanced		Location			Credits				
				Y	N	Y	N	Y	N	No. Courses/Year	No. Students/Year	No. Courses/Year	No. Students/Year	Central	Regional	All Areas	Academic or CEU Y	N	Other Credit		
CONNECTICUT	R	1	100	X	-	-	-	-	-	1	20	-	-	X	-	-	-	-	-	-	
MAINE	R	2	50	1	-	1	-	X	-	-	-	-	-	-	-	-	-	-	-	-	
MASSACHUSETTS		1	150	X	-	-	-	X	-	2	40	1	20	X	-	-	-	X	-	P	
NEW HAMPSHIRE	R	1	5	X	-	-	-	-	-	1	15	1	15	X	-	-	-	-	-	-	
RHODE ISLAND	R	-	-	-	-	-	-	-	-	1	18	-	-	X	-	-	-	X	-	P	
VERMONT	R	1	6	X	-	-	-	X	-	1	30	1	20	X	X	-	X	-	-	P	

Legend

Respondent
R - regulatory Agency

Financial Support
P - public funds through approp. to agency, etc.

Source: Roles and Responsibilities for Developing a Comprehensive State Water and Wastewater Operator Training Program, Association of Boards for Certification for Operating Personnel in Water and Wastewater Utilities (ABC); July 1976.

TABLE XXXV

NEW ENGLAND STATE WASTEWATER OPERATOR TRAINING SUMMARIES

PART B

		Seminars			Corresp. Courses			Self Instruction			Operator Training Required		Level of Expenditures (in 1000s)		
State	Respondent	No. Courses/Year	No. Students/Year	What Credit	What Courses	Who Administers	No. of Students	Type of Instruction	Who Supervises	No. Participants	New Entries	Up-Grade	1975	1976	Really Needed
CONNECTICUT	R	1	120	-	-	-	-	AV	R	10	100	100	-	-	-
MAINE	R	2	50		-	-	-	-	-	-	60	15%	-	-	-
MASSACHUSETTS		2	200	-	SC	S/R	100	-	-	-	300+	300+	-	-	MORE
NEW HAMPSHIRE	R	8	60	-	SC	R	60	-	-	-	30	40	4	6	15
RHODE ISLAND	R	1	12	-	-	-	-	-	-	-	25	5	1	-	-
VERMONT	R	8	70	-	SC	C	10	-	-	-	15	8			

Legend

Respondent
R - regulatory agency

Corresp. Courses
SC - Sacramento State University

Who Administers CC's
S - supervisor
R - regulatory agency
C - college

Self Instruction
AV - audiovisual

Source: Roles and Responsibilities for Developing a Comprehensive State Water and Wastewater Operator Training Program, Association of Boards for Certification for Operating Personnel in Water and Wastewater Utilities (ABC); July 1976.

as insuring effluent standards compliance, a regional commission should be established to standardize certification practices from state to state within New England.

D. Career Potential

Future careers in the wastewater programs of EPA Region I will continue to require extensive professional training. Since much of the effort will be in the areas of technical assistance, and review and monitoring activities, engineers with planning and/or management backgrounds will be in the greatest demand. A need for environmental scientists and environmental technicians will still exist, although not in the same order of magnitude as for engineers. Additionally, administrative professionals should continue their traditional entry into this field.

The greatest potential for future employment over the next five years will occur at the municipal level and in private industry. The construction grant program and the NPDES program have had their greatest impact on these two sectors. With the increased number of wastewater facilities in operation (including industrial pretreatment facilities), as well as an increased level in complexity of operation, the demand for technically competent operations and maintenance personnel will continue. In the private sector, on-site construction-related careers will continue to develop over the duration of facilities construction, i.e., until 1980. Additionally, indirect employment from this federal grant program should provide sustained career opportunities for engineering consultants and other contractual professionals. Finally, state governments in Region I should also have an increasing demand for professional personnel as more and more FWPCA responsibilities are delegated to them resulting in additional administrative and managerial requirements.

E. Conclusion

The Region I wastewater program is entering the second phase in the implementation of the Federal Water Pollution Control Act. The construction grant program and the NPDES program are both well underway and it is hoped that the region will be able to delegate additional functions of both these programs to the states shortly, allowing the regional wastewater program to concentrate on new priorities.

Priorities of the future will focus primarily on the control of non-point source pollution through an upgrading of 208 designated and non-designated activities and toxic pollutants abatement and control. Additionally, Region I is expected to increase its water quality monitoring and analysis activities, resulting in a substantial upgrading of its ambient water quality monitoring program. This new approach to more intensive monitoring will result in a more thorough determination of whether national water quality standards are or are not being met in New England. Lastly, the region's Clean Lakes Program is expected to be bolstered considerably as more resources become available for this activity.

Staffing levels within the regional program will continue to grow with potentially abrupt increases in 1978 and 1979 and a leveling off thereafter as all programs reach their maintenance and monitoring levels. The demand for new employees will be directed primarily towards the acquisition of professional engineers as well as traditional administrative professionals. Careers at the technician level could potentially increase by 1980 as an intensive water monitoring stage is approached.

Employment in the private sector, generated by the construction of wastewater treatment facilities in New England, has been the major economic impact of this federal grant program. The following short article provided by EPA Region I reviews the status of employment generated by this program both directly and indirectly.

EMPLOYMENT GENERATED BY CONSTRUCTION OF WASTEWATER TREATMENT FACILITIES IN NEW ENGLAND

Employment data submitted monthly by EPA-funded construction grant contractors show that there were 3,584 persons employed at on-site jobs throughout the six-state region for the month of July, 1976. These data, submitted as a statutory requirement, are filed with EPA regional offices to show compliance with civil rights regulations. They reflect employment at 152 different projects. Employment generated by these projects had an initial contract value of $485,132,000 (this figure includes the federal, state, and local share). This reduces to a rate of 7.4 jobs per million dollars for the urban state of Connecticut to a high of 22.9 jobs per million for rural Vermont.

Average monthly on-site employment for 1976 amounted to 3,001, somewhat below the 1975 average of 3,105. The highest monthly employment figure reported thus far in the program occured during September 1976 when 3,996 workers were at on-site construction jobs. During 1976, approximately 11.5 percent of the jobs were held by minorities. This was one percent higher than 1975 but below levels reported for 1972 and 1973.

Although actual on-site activity numbered 3,584 for the month under review, July 1976, (which incidentally showed the 4th highest monthly employment for 1976), it is appropriate to relate this statistic to time, i.e., average duration of construction activity. The National Commission on Water Quality reported typical on-site construction time for sewage treatment facilities is 30 months with a range of 24 to 36 months.

Using 30 months as the average period of on-site construction employment and correcting for the more representative average monthly employment for 1976 of 3,001, we can calculate that each million dollars worth of water pollution control construction work creates 15.5 man-years of employment over the duration of the project.

As of February 1, 1977, the EPA regional office had an estimated $446 million available in construction grant funds remaining to allocate among the six states. This sum, when added to the state/local share will total $621 million, enough to provide somewhat more than 9,600 man-years of on-site construction employment over the duration of the facilities construction work. In addition, there will be a substantial amount of indirect employment generated at the regional and national level. Manufacturing, consulting, and a variety of service industries will benefit from these expenditures. Presently, research indicates that the indirect employment impact amounts to about 19.5 jobs per million, which when multiplied by the aggregate wastewater facilities construction dollars still to be contracted for, $621 million, will result in another 12,000 jobs.

Finally, the importance of wastewater training at all levels of government and industry cannot be overstated. At this time there exists a severe deficiency in this area which has fortunately been recognized by EPA headquarters and will be acted upon during FY 1978. The initial impact of this training strategy will be on municipal operator personnel to ensure proper operation of existing plants.

VIII. ENERGY

FEA's energy conservation programs saw major changes between 1975 and 1976. The most significant change occurred with the passage of the Energy Policy and Conservation Act (EPCA) enacted on December 22, 1975. This act established some new directions for conservation by establishing a State program and expanding ongoing voluntary efforts in the consumer product and industrial areas. Also included in EPCA were mandatory fuel economy standards for new automobiles after model year 1977. Substantial efforts are underway to implment the provisions of EPCA. In addition FEA is continuing to work on various other programs. See below for a description of EPCA conservation requirements.

SUMMARY OF FEA'S MAJOR CONSERVATION REQUIREMENTS MANDATED BY THE ENERGY POLICY AND CONSERVATION ACT (PUBLIC LAW 94-163) ENACTED DECEMBER 22, 1975

- Publish and distribute booklets on the fuel economy of passenger cars in each model year in conjunction with Department of Transporation (DOT) and Environmental Protection Agency (EPA) automotive efficiency programs.
- Conduct a program to improve the energy efficiency of consumer products other than automobiles by setting energy efficiency goals for major categories of appliances, establishing test procedures and educating people on how to use operating costs in comparative shopping.
- Develop a program to promote increased energy efficiency by American industry and to establish voluntary energy efficiency improvement targets for at least the 10 most energy-consumptive industries.
- Participate in a program, under executive order, to develop a 10-year plan for energy conservation with respect to Federal buildings.

A number of conservation programs are conducted to achieve specific energy objectives in each of five target areas identified:

1.) The residential/commercial sector,
2.) The industrial sector,
3.) The transportation sector,

4.) The public/private utilities sector,
5.) Federal, state, and local government sector.

Marketing and educational support is provided by FEA to all energy conservation programs within each sector. Additionally, educational programs for the public and schools are developed for use. Activities associated with these energy conservation programs represent most of FEA's conservation efforts. Following is a summary of Conservation Programs.

SUMMARY OF FEA CONSERVATION PROGRAMS

Program	Date Started	Purpose
	RESIDENTIAL/COMMERCIAL	
Project conserve	Feb. 1975	To encourage homeowners on a pilot basis, to improve voluntarily the thermal efficiency of their homes by providing calculations of home improvements costs and energy savings of each home according to responses to questionnaires.
Lighting and Thermal Operations	Nov. 1974	To reduce the energy consumed for lighting, heating, and cooling in commercial buildings through voluntary implementation of guidelines.
Public schools energy conservation service	Aug. 1974	To improve the energy efficiency of school buildings.
Building energy conservation service		To encourage State and local governments to incorporate voluntarily into their building code model energy-efficiency standards.
Low-income weatherization		To purchase insulation and other materials for the homes of low-income persons, particularly the low-income elderly and handicapped.
Consumer product energy efficiency	April 1973	To improve the energy efficiency of major consumer products (e.g., refrigerators), including assistance to FTC in the labeling of such products. Also to educate the public about ways to compare energy efficiency of different products.

Program	Date Started	Purpose
	INDUSTRIAL	
Voluntary industrial energy conservation	1974	To encourage greater energy efficiency in American industry, especially the 10 most energy-intensive industries, by identifying conservation potential, removing barriers, determining saving goals, obtaining data, etc.
Technical transfer	1974	To disseminate information on industrial energy conservation potential and technology.
EPCA: Identification/ ranking, target setting, reporting requirements	Dec. 1975	To assure implementation of specific EPCA requirements concerning industrial programs.
Analysis and evaluation	1973	To analyze and evaluate technical and operational energy conservation options, opportunities, and policies.
Waste oil recovery and utilization	June 1975	To promote the recovery and re-use of waste oil.
	TRANSPORTATION	
New car fuel economy and labeling This is a report on '76 action	March 1975	To educate the public on automobile efficiency and assist EPA and DOT in mandatory fuel economy standards and labeling program.
CAB load factor	Jan. 1976	To encourage reduced energy-usage for intercity passenger transportation by increasing the percentage of seats occupied on aircraft based on passenger miles traveled.
Voluntary fuel economy for trucks and buses	Oct. 1975	To encourage truck and bus manufacterers voluntarily to improve fuel economy.
	UTILITIES	
Utilities Conservation Action Now (UCAN)	Aug. 1975	To encourage voluntary participation of gas and electric utilities, State regulatory agencies, energy offices, and public interest groups in achieving greater energy efficiency.
Gas utilities demonstration projects	Jan. 1976	To identify methods of increasing the end-use efficiency of natural gas and to remove institutional barriers to retail gas rate reform.

Program	Date Started	Purpose
	UTILITIES continued	
Electric Utility demonstration projects	Jan. 1976	To identify methods of increasing the overall efficiency of generation, transmission, and use of electricity and to remove barriers to adoption of rate reforms and load management practices.
Federal intervention in State regulatory hearings	April 1975	To encourage adoption of time-varying pricing, flattened energy charges, load management practices, increased conservation activities by major utilities.
	FEDERAL GOVERNMENT	
Federal Energy Management Program (FEMP)	June 1973	To implement a plan for energy conservation through 1985 with respect to buildings owned or leased by the Executive Branch and to participate in the FEMP under EPCA.
	CROSS-SECTOR	
State energy conservation	Jan. 1976	To assist states to develop and implement plans by technical assistance and funding.
Energy conservation education	1975	To provide information to the public on energy problems, alternative solutions, and actions to implement solutions.

FEA ENVIRONMENTAL POLLUTION ABATEMENT AND CONTROL ACTIVITIES

The Environmental Branch of the Energy Conservation, Environment and Resource Development Division is the agency's primary mechanism for dealing with pollution abatement and control as it relates to and effects energy generation in New England. The primary functions of this branch are to:

1.) Review Environmental Impact Statements as they relate to energy;
2.) Provide advice to other federal agencies regarding the impact of an Environmental Impact Statement on energy-related matters;
3.) Identify problems of environmental impact on energy-related matters;
4.) Provide technical assistance on environmental impacts related to energy matters.

FEA CURRENT STAFFING LEVELS

The Federal Energy Administration of Region I is currently staffed by 88 individuals as shown below.

TABLE XXXVI

REGION I FEDERAL ENERGY ADMINISTRATION

Current (1977) Staffing Level

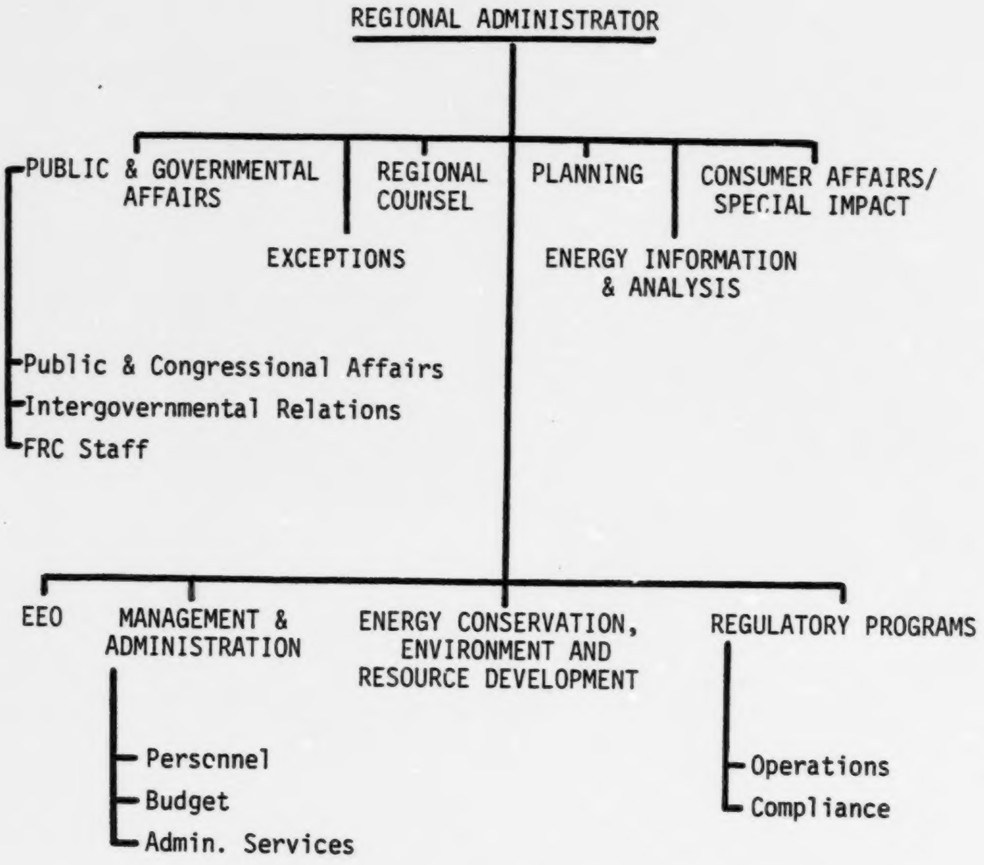
Office	1977
Regional Administrator	5
Public and Governmental Affairs	5
Federal Regional Council Staff	3
Exceptions	2
Regional Counsel	5
Planning	3
Energy Information and Analysis	2
Consumer Affairs/Special Impact	1
Equal Employment Opportunity	1
Energy Conservation, Environment and Resource Development	9
Regulatory Programs	43
Management and Administration	9
TOTAL	88

Of these 88 individuals, 65 are employed in a professional capacity; 10 are employed in a technician capacity; and 13 are employed in a clerical capacity.

REGION I ORGANIZATION

FEDERAL ENERGY ADMINISTRATION

Figure 11.


REGIONAL ADMINISTRATOR
PUBLIC & GOVERNMENTAL AFFAIRS
REGIONAL COUNSEL
PLANNING
CONSUMER AFFAIRS/ SPECIAL IMPACT
EXCEPTIONS
ENERGY INFORMATION & ANALYSIS
Public & Congressional Affairs
Intergovernmental Relations
FRC Staff
EEO
MANAGEMENT & ADMINISTRATION
ENERGY CONSERVATION, ENVIRONMENT AND RESOURCE DEVELOPMENT
REGULATORY PROGRAMS
Personnel
Budget
Admin. Services
Operations
Compliance

SUMMARY

In order to continue to work effectively and efficiently towards cleaner air, water, and land, it is expected that each of the eight pollution abatement and control (A/C) programs addressed in this study will require increased personnel resources at some time between 1976 and 1981. Generally, it was found that the total staffing level of these programs will, on the average, gain workforce increases of 38 percent by 1981. On a yearly basis this is equal to roughly a 7 percent per annum increase. Previous yearly growth was judged to be around five and one-half percent. It should be noted that the bulk of these projected gains are likely to occur during 1978 and 1979 with the most dramatic increases occurring in wastewater, solid waste, and air. It should be noted that 7 percent per annum rate has been judged to be somewhat conservative as toxic substances A/C growth has not been included, nor have any increases in radiation despite an anticipated increase by EPA in regional radiation activities. Additionally, the proposed decentralization of the Office of Pesticide Programs has not been included in these estimates.

A common goal among the programs in Region I is the delegation of responsibility for pollution control and abatement programs to state and local governments. The Regional personnel envision their roles as that of providing guidance and technical assistance, monitoring, reviewing, and enforcing federal regulations. To accomplish this, adequate staffing will be necessary in the Regional Office until such time as the states are able and willing to adequately implement the programs. If the states do not assume this responsibility, the Regional Office will have to implement the programs. In either case, growth in Region I is anticipated to continue during the five year scope of this study.

The degree to which states are willing to assume responsibility for program implementation will have a dramatic effect on staffing levels in the Regional Office. Although most of the states in Region I have been willing to take the lead in the administration of environmental programs, several factors continue to impede the process. First of all, funding is a problem in each of the states. State budgets are limited and legislatures are looking at the environmental programs with increased scrutiny, especially when EPA will run a program if not administered by the state. Secondly, states are reluctant to initiate programs which may be politically unpopular, costly, and regional rather than statewide in nature. A direct correlation generally exists between the size of a state's program and the number of federal dollars spent on it. Thirdly, the amount of federal red-tape involved in a program often causes confusion to the states and discourages their participation. The continual revisions and changes in the laws also tend to increase skepticism in the states about the programs.

As previously indicated, the program personnel in Region I anticipate a significant increase in staffing over the next five years. The major portion of the increases will be at the professional level with the demand continuing for engineers and scientists. Opportunities will also become available for persons with technical training although the demand for technicians will not be as great as that for professionals. Turnover has generally been low in the Regional Office (10 percent) with much of it occurring in the clerical positions. Federal salaries and benefits are good, especially when compared with the states, and this may account for the employment stability. The real growth, however, is expected to occur in the private sector and in state and local governments, where the bulk of the workforce will be located. As a result of the construction grants program alone, more than 19,400 person-years of employment are expected to be generated in New England over the next three years.

The efforts in Region I over the next five years will focus on new priorities as well as the continuation of current activities. Toxic substances, solid waste, integrated pest management, and underground injection control are some of the programs which will be receiving priority emphasis. It is impossible to project at this time accurate workforce figures on the impact of these programs in Region I. The Regional Office is moving aggressively to resolve environmental problems and provide the guidance and assistance to the states that is necessary for the success of the programs.

In conclusion, the following points expressed by the Regional Administrator of EPA Region I denote the importance of EPA's relationship to state and local programs and the absolute importance of an adequate and strong federal environmental workforce in New England, until at such time primacy for all programs is delegated.

1. It should be recognized that we cannot expect more work from the States without additional support. In those instances where we expect the states to perform additional work at their own expense, the chances of success are reduced. (Our discussion of the State Delegation issue makes a suggestion in this regard.)

2. Where achievement of program goals depends on local initiative and regulation, the chance of success is also diminished. These situations should be closely monitored to determine if resources are accomplishing their purpose. Where this is not the case, funds should be discontinued and where possible shifted to more productive areas.

3. States work more effectively where the need is well justified in terms of total social needs, and the goals appear to be attainable.

4. The State's role in enforcement programs as we move into the operation and maintenance of treatment facilities is especially crucial. Since it is unlikely that EPA can do it all, adequate state resources to detect violations and a state's willingness to enforce are essential. But, being one step closer to specific situations, and possibly not agreeing with EPA legislative requirements, the states are less likely to take aggressive enforcement action. We may therefore be faced with a choice of increasing EPA enforcement resources, or compromising the environmental standards. Certainly special effort is needed to oversee the States which have accepted NPDES authority, and to do everything possible to upgrade the states which have not.

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